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SAMI VE LLC

VALUE STUDY

TA-21 Material Disposal Area Capping Concepts and Strategies

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VALUE STUDY

FINAL REPORT

PROJECT:

TA-21 Material Disposal Area Capping Concepts and Strategies

STUDY END DATE: August 29, 2007

Conducted For and With:
Los Alamos National Security (LANS), LLC
Los Alamos National Laboratory (LANL)
MOTA Corporation
TA-21 Site Closure Team

Location of Study:
MOTA Corporation Conference Room
Los Alamos, NM

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Systematic Analytic Methods and Innovations

VALUE STUDY TEAM ACKNOWLEDGMENT OF ACTIVITY TEAM AND CONSULTANTS

The value study team wishes to express thanks and appreciation to the activities team who were always professional, readily available, and unfailingly helpful. Special thanks are made to Conrad Cooke, Ron Rager, and Joe Hebert who were the mainstay for the team's support and success. The success of the study team effort could not have been possible without the assistance of these individuals.

The team wishes also to express thanks and appreciation to those listed on the Consultation Record of this report. The cooperation and helpfulness of those consulted contributed greatly to the technical foundation and support of the team's deliberations and proposals.

The aim of using the Value Method is to achieve the best worth for the cost (value) for the project. It is only with the full team effort, as shown by all involved, that this goal can be achieved. This study represents the product of such an effort.

GENERAL DISCUSSION OF THE VALUE METHOD PROCESS, ITS PURPOSE, AND THIS VALUE STUDY

The Value Method is a highly effective decision-making process. It consists of a series of procedures that occur in a preplanned sequence. Larry Miles originally developed it in 1943. In general, it is a systematic and organized process to creatively develop alternatives that secure essential functions at the greatest worth as opposed to their life-cycle cost (highest value). It has many applications but is most often used as a management and problem-solving tool.

A job plan is used throughout the value study activity. In brief, the component features from a process, program, project, process, or activity are examined to determine pertinent functions, governing criteria, and associated costs. Next, using creativity techniques; ideas, concepts, and potential proposals are generated. Then through an analysis process, priorities for due diligence activities are identified and put forward for development of the remaining best ideas. Those alternative methods that fully meet necessary requirements at a lower cost, or with an increase in the long-term values, are proposed for adoption by the parties responsible for the project.

This report is the result of a "formal" Value Study Team effort. A formal value study team is comprised of people with the desired expertise and independence. They have an understanding of the needs of the organization they represent, and can take an open and independent view of the project being studied. Ideally, they have not been notably involved in the project prior to the value study. Using the Value Method applied to the current collected data, the study team takes a "fresh look" at the project to create alternatives that fulfill the client needs at the greatest recognized attainable value.

The Value Method has many common names. These mainly relate to the historical features, the timing of its application, or type of process, program, project, or activity studied. It is often referred to as Value Analysis (VA), Value Management (VM), Value Engineering (VE), and Value Planning (VP).

The application of the process has been highly successful for more than 60 years for both private and governmental entities. As a result, the Federal government has mandated its use in all Federally funded operations. This value study report demonstrates the required substance that quality Value Method procedures were used throughout this value study, as stipulated under the mandated governmental Value Program oversight authorities and the recommendations of the Value Method profession.

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EXECUTIVE SUMMARY

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Introduction:

The value study team consisted of individuals with senior level expertise in nuclear operations, construction, demolition and decontamination, decommissioning, project management, occupational health, environmental compliance, and project management specializations. The team conducted the first group meeting for the value study on Wednesday, August 22nd, 2007. The study team concluded their full formal team efforts on August 29, 2007. A presentation of the value study results to the technical group management of LANL, MOTA, and others, took place at the conclusion of the study on August 29, 2007 and the completed report was released September 6, 2007.

Summary of Proposals:

The value study team made a total of **10** major proposals. (These are alternative methods that were developed during the value study to the point that they were complete enough for decision-making and comprehensive presentation).

Using value method practices and an understanding of the concepts established before the value study, the study team generated over 20 major concepts. In accordance with the probability matrix ranking, the study team selected, developed, and evaluated 15 specific proposals that were determined to have a high potential for reducing costs or improving performance. The **total estimated net savings** of the evaluations completed during the value study, if all independent monetary savings proposals are accepted, are estimated up to **$10 million dollars**.

The process also generated several **value-added** features to the concepts. (Value added features are defined as attributes that the study team believes will improve the final product in non-monetary or hard to quantify ways, e.g., time, quality, and safety. Any increased initial or Life-Cycle Costs (LCC), if any, are expected to be more than offset by the apparent added non-monetary value.

A very brief description and an estimate of the minimum potential value of the proposals are:

1. Optimized single TA-21 cover system base case
There are strong arguments for leaving in place the waste in MDA-A and MDA-T. This proposal is the base case to design a cover system to effectively and safely capture the maximum amount of waste at the TA-21 area at a reasonable cost. This concept incorporates MDA-A and MDA-T under a single cover system using the guidance in LA-UR-06-4715, April 2007. This base case assumes a single ET cover system will be used for both MDA-A and MDA-T. The cover system design has been derived to include an 8.5-foot thick ET layer above a 1.5 thick foot biological barrier. The cap will include a conventionally sloped skirt except in the northwest corner where a retaining wall is included because of the steep falloff in the adjacent canyon. Monitoring systems are included. The total project marked-up cost for the base case has been estimated as $13,717,000, assuming all fieldwork will be conducted by subcontractors.

2. Retention barriers - specific to each MDA - Waste region
This proposal investigates the cost range for two engineered covers one over MDA-T and the other over MDA-A. To remove the need for a gradual declination of both caps due to the sharp fall off this proposal considers the use of two (2) separate contiguous retaining walls to provide appropriate erosion mitigation. The caps will extend to over the current perimeters of the two waste regions. All materials used in the cap are to be obtained locally and assumed to be suitable. The retaining walls will traverse the perimeters of both waste regions and enclose them totally and have a height of approximately 10 ft. Note that the retention wall does not have the function of preventing the migration of contamination its function is purely to prevent the erosion of the cap material. The estimated cost of this proposal is $11,100,000 providing an estimated saving of $2,600,000 against the base cost.

EXECUTIVE SUMMARY

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

3. Retention barriers - specific to each MDA - Close proximity
This proposal, an enhancement of proposal No. 2, similarly investigates the cost range for two engineered covers one over MDA-T and the other over MDA-A waste regions but in close proximity to the periphery of the waste perimeters to further reduce the footprint of the cover and hence required volume of fill. The estimated cost of this proposal is $9,300,000 providing an estimated saving of $4,400,000 against the base cost.

4. Concave cap
Moisture retention is critical in maintaining the integrity of an ET cap in arid regions. This is especially true in Los Alamos where the annual evaporation rate is roughly three times the annual precipitation. The traditional mound design for disposal site caps encourages water runoff rather than absorption. This proposal would use a concave cap to create a dish to encourage absorption and retention of the needed moisture. It would also reduce the requirement for capping material by approximately 20,500 cubic yards and the associated cost by about $400,000.

5. Enhanced retaining wall
This VE study proposed a reinforced concrete retaining wall be erected around the MDAs instead of the sloped ET cap skirt. Reinforcing the wall with stacked boulders or gabion structures is being considered due to concern that the concrete retaining wall may not withstand the 1000-year confinement period. This concept has been examined for 5 different configurations in a parametric fashion. Advantages, disadvantages and costs were considered. The team's conclusion is that a bare reinforced concrete retaining wall around the individual MDA caps will be sufficient to meet the site requirements at a cost that is about $1,500,000 less than the enhanced wall.

6. Horizontal monitoring
Previous studies have shown that contamination is moving on and around the Los Alamos site. Regulatory guidance dictates that waste disposal sites should be monitored to detect any migration at the earliest possible time. The unique topography of the TA -21 site will allow installation of horizontal wells. This proposal would install 32 horizontal wells beneath MDA-A and MDA-T. The result will be a more comprehensive monitoring system at a life cycle cost savings of $3.3 million.

7. Placement of D&D in gap between MDA A&T
The baseline cover design assumes combining the A and T disposal areas under a single cover. A longitudinal gap of ~150 ft with a width of ~ 150 ft exists between the two disposal regions. This study considered filling this void space with waste previously destined for costly off site disposal. Calculation of the gap waste disposal volume showed at least 5,000 CY of additional waste could be placed.. The objective would be to place waste material from TA-21 D&D which had the greatest cost benefit. This would be ferrous material where the unit cost for packaging, transport, and disposal –even conservatively assuming zero disposal cost at NTS in the near future is $16.10/CF. However, due to logistics and schedule factors the waste would be a mixture of both ferrous and other D&D debris. Cost factors associated with possible lag storage between D&D operations and waste compaction to prevent settlement were included in the cost. The total cost savings calculated ranged between $0.8 to 1.8 million.

8. Beneficial reuse of TA-21 D&D concrete in the MDA Cover
Previous VE studies of TA-21 D&D building demolition waste showed that structural concrete waste material could beneficially be reused as a portion of the MDA earthen covers. Specifically identified was placement of this material in a bio-intrusion layer within the cover. This layer is intended to prevent animal penetration through the cover to the emplaced waste material, thereby enhancing the cover long-term stability. A concrete scabbling machine would be used to remove the outer (contaminated) surface of concrete walls and floors. The demolished concrete rubble would be screened and segregated by size. Following, the individual batches would be assayed for acceptable activity levels and than approved as suitable for cover usage. The economic benefit would be the elimination of the costly packaging, transport, and off site disposal of the material. A secondary benefit is reduction in Los Alamos traffic management concerns for the outgoing shipments. The total cost savings was conservatively estimated, assuming zero disposal cost at the NTS, and is $3.8 million.

EXECUTIVE SUMMARY

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

9. Electronic automated digital photographic monitoring
A 100 year time period following MDA closure, including completion of the earthen cover, is allocated for active monitoring of the cover status. During this period the site operator must maintain surveillance of the cover status and perform periodic maintenance as deemed necessary to ensure stable disposal conditions for the following 900 years. Borrowing from commercial landfill experience and recent improvements in digital technology continuous "time-lapse" digital photography is proposed as a viable supplement to periodic walk-down inspections of the cover exterior. The resulting digitized photographic evidence would be maintained in a computerized database and audited frequently for completeness and effectiveness. Benefits would include real time assessment of the impact of weather and intruder incidents, and assessment of the effectiveness of any remedial action or repairs to the cover. It would also provide a continuing visual database of the cover status, thereby serving as regulatory evidence of compliance with maintenance and disposal stability requirements. Costs are based on reduced frequency of walk down inspections, with a cumulative savings of ~ $3 million over a 100 year period.

10. Integrate TA-21 cover system and D&D activities
Integrating the D&D of the facilities at TA-21 with installation of a cover system on MDA-A and MDA-T provides a means to show early progress to NMED by tackling the overall work in discrete phases that can show visible progress earlier than might otherwise be the case. Such integration has the potential to save costs by 1) avoiding NMED fines, and 2) optimizing fieldwork by minimizing potential interferences/ interruption of cover system installation and placement of demolition materials in available space beneath the cover system.

Summary of Additional Items for Further Study:

Two additional items were also recommended for further study. These are items that, due to time constraints, the lack of apparent large savings or significant value added identified during the initial idea evaluations made it inadvisable for the team to pursue. However, they are respectfully submitted for further consideration and development to provide additional value for the project.

Certification of Completeness:

SAMI, LLC facilitated the subject study with value process certified personnel VESI 20010101 and SAVE 950501 and hereby warrants that the subject study meets all guidelines under the subject certifications.

This study fully meets the requirements of PL 104-106, OMB A-131, DOE M 413.2, DOE M 413.3, and similar governmental standards.
reference: http://oecm.energy.gov/Default.aspx?tabid=248

VALUE STUDY TEAM MEMBERS

LANL TA-21 Waste Disposal Options

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ALTERNATIVE EVALUATION FOR PROPOSAL NO. 1

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cover System	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 1 OPTIMIZED SINGLE TA-21 COVER SYSTEM BASE CASE
(Formerly Concept DM)

This proposal is the base case to design a cover system to effectively and safely capture the maximum amount of waste at the TA-21 area at a reasonable cost. This concept incorporates MDA-A and MDA-T under a single cover system using the guidance in LA-UR-06-4715, April 2007. The other proposals will be use this base case as a reference.

ADVANTAGES / BENEFITS	DISADVANTAGES
• A single cover over both areas provides additional capacity to include TA-21 facilities' D&D waste for both lag storage and permanent disposal • Optimization of cap height and slope minimizes erosion • Optimization minimizes quantity of material needed for the cover system • Technology is state-of-the-art • Conventional design reduces the potential for technical and regulatory controversy	• Will require substantial rock reinforcement and steeper side slope compared with barrier alternatives to avoid overlap of the canyon slope fall-away in the northwest corner of the area. • The base case is defined without optimization. Its relative disadvantages will become apparent as other alternatives are evaluated. • Covers the existing north road location, eliminating its use for inspection access. Requires removal of the road surface to allow drainage and prevent cover slope side erosion. • It is more expensive than some of the other alternatives

IDENTIFIED RISKS:

- The potential for overlap atop the slope on the northwest area of the area increases the likelihood of cap edge failure by erosion.
- Insufficient cap height can result in desiccation and consequent loss of vegetation

Note: This proposal is a basis for comparison of other proposals.
This proposal is mutually exclusive with proposal 2, 3 and 4.

COST COMPARISON FOR PROPOSAL NO. 1

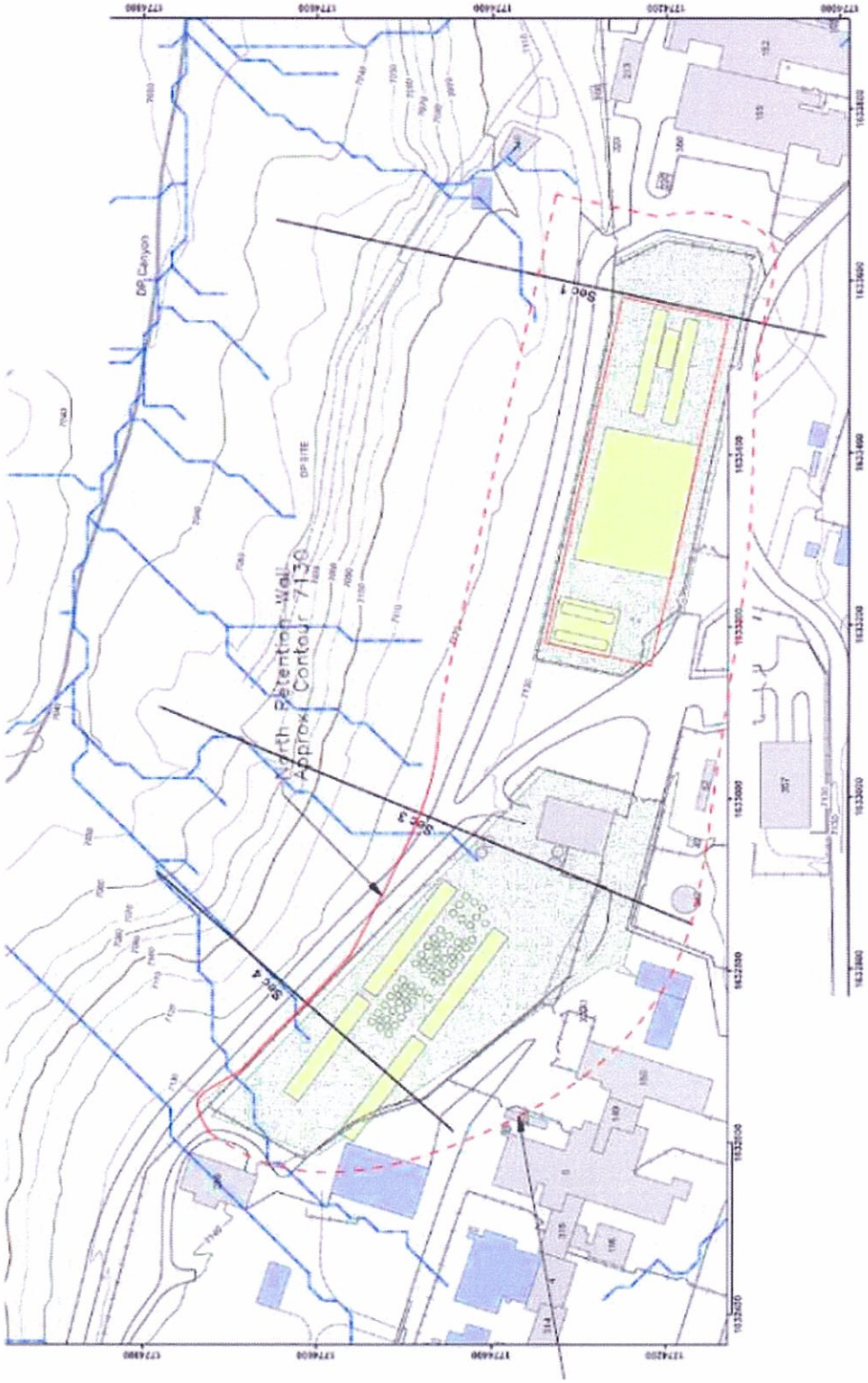
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
- Cap A and T separately with an ET cover	- NA baseline case for comparisons

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	13,717,000	
VALUE CONCEPT (-)	NA	
SAVINGS	NA	
NUMBER OF UNITS (X)		
TOTAL SAVINGS	NA	
IMPLEMENTATION COSTS(-)		
NET SAVINGS	NA	

Notes:

Figure 1-1. Proposal 1 – Baseline Case



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DESCRIPTION - VALUE STUDY PROPOSAL NO. 1

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:
There are strong arguments for leaving in place the waste in MDA-A and MDA-T. Multiple concepts for installing a cover system over these areas are being considered during this VE study. This requires a technically viable design provides a basis for comparison of other alternatives.

Proposal:
This proposal is the base case to design a cover system to effectively and safely capture the maximum amount of waste on the TA-21 plateau at a reasonable cost. This concept incorporates MDA-A and MDA-T under a single cover system using the guidance in LA-UR-06-4715, April 2007. The other proposals will be use this base case as a reference.

Assumptions:
This base case has the following assumptions:

- A single ET cover system will be used for both MDA-A and MDA-T using the guidance in LA-UR-06-4715. The cover system design has been derived to include an 8.5-foot thick ET layer above a 1.5 thick foot biological barrier. The cap will include a conventionally sloped skirt except in the northwest corner where the adjacent canyon falls of steeply.
- The disposal pits on the east end of MDA-A will NOT be exhumed and disposed
- A limited length wall or rock reinforcement will be used in the northwest corner where the ravine slope is close to MDA-T to reduce the potential for long-term erosion of the cover system side slope
- All utilities within the bounds of the cover system will be removed.
- The existing security fence will be removed and a new one installed around the cover system
- The north road paving will be removed
- Cover material will consist of the existing top layer, using fill from TA-61, and a biological layer (barrier) from local sources.
- A time domain reflectometry (TDR) system will be installed to monitor moisture
- Horizontally sloped pipes at 50 ft intervals will be placed beneath the MDA area from the canyon side to monitor for migration of contaminants.

Key cost estimating assumptions are:

- All field work is conducted by subcontractors
- Project management and project support are estimated as level-of-effort (LOE) activities that include 6 months work prior to initiation of field work for purposes of engineering, specification, bid, and evaluation. The overall schedule duration is based on productivity rates applied to the volumes of material to be placed and areas to be treated. This duration was also used for estimating the LOE project management and project support costs during the fieldwork.
- Subcontractor training is 3 days for all workers.
- The estimates are conceptual. They have been conducted with a combination of applying parametric unit costs, some allowances, a couple of elements from the RACER results, and multipliers, which are:
  - G&A: 13%
  - Markup of subcontracted costs: 13%
  - Prime contract fee: 10%
  - Contingency: 35%; because of the conceptual nature of the estimate
- Data from R.S. Means Heavy Construction Cost Data for 2006 was used for most of the unit costs, with adjustment by the team for differences between generic commercial and Los Alamos work. Others were obtained by web searches or from the experience of the team.
- Unit lengths (e.g., for fencing), areas (e.g., for re-vegetation), and volumes (e.g., for cover system and barrier construction) were scaled from contour maps of the area.

IMPLEMENTATION OF PROPOSAL NO. 1

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

Whether concrete barrier for the northwest slope toe reinforcement will qualify for 1,000-year life.

Should the schedule be shortened by using more than two crews in cases where such does not appear to be needed?

Detailed planning should be coordinated with TA-21 demolition projects.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

DOE and LANS should evaluate the current strategy of exhuming the two eastern pits of MDA-A in light of leaving other wastes in both MDA-T and MDA-A that may be more onerous.

CALCULATION OF EARTHEN CAP THICKNESS DISCUSSION

References:

1) LA-UR-06-4715-April 2007, Cover Design Guidance and Requirements Document
2) NOAA PMP Data for Probable Maximum Precipitation, Los Alamos, NM

Calculations:

1. ET Fill depth

From eq 3.1-Ref 1 $NSC = (FC-PWP)\ b$

Where: NSC = net storage capacity, in
PC = field capacity, in
PWP = permanent wilting point, in
b = soil layer thickness, in

or $b = \frac{NSC}{(FL-PWP)}$

from reference 2 - NOAA data

100 yr and 1,000 yr frequency for 30 days - maximum precipitation = 0.01 inches/hr

- or -

0.01 inches/hr X 30 days/month X 24 hrs/day = 7.2 inches

From Figure 3.1-1 for poor grade soil (worst case except sand)

FC - WP = 0.07

Hence b = 7.2 inches / (0.07)(12 inches/ft) = 8.57 ft, call **8.6 ft**

2. Bio-Intrusion layer - dependent upon burrowing animal

from table C-2.6-1 of reference 1

Pocket Gopher	10-30 cm
Kangaroo Rat	40-50 cm

Hence typical average is ~ 40 cm or 16", call **1.4 ft**

3. Reasonable cap depth = ET soil + bio barrier = 8.6 ft + 1.4 ft = 10.0 ft

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 2

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cap	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 2 RETENTION BARRIERS – SPECIFIC TO EACH MDA
(Formerly Concept P)

This proposal investigates the cost range for two engineered covers one over MDA-T and the other over MDA-A waste regions. To remove the need for a gradual declination of both caps due to the sharp fall off in the north region and also the lesser requirement for 'fall off' on the south side this proposal considers the use of two (2) separate retaining walls of appropriate height to provide appropriate erosion mitigation of both caps for the 1,000 year life.

The caps will extend to over the current perimeters of the two waste regions approximately and average of 75 ft. The cap for MDA-T will be approximately 500 ft x 260 ft and for MDA-A 600 ft x 260 ft. All materials used in the cap are to be obtained locally and assumed to be suitable.

All retaining walls will traverse the perimeters of MDA-T and MDA-A and enclose them totally being approximately 1 ft and 7 ft thick at the top and bottom respectively and have a height of approximately 10 ft. The walls will be built to appropriate ACI/ASTM/DoE standards to support longevity with the application of appropriate surveillance and timely repair. (Reinforced concrete cracks due to aging, settlement, and corrosive environs and one cannot really prevent this. That is why concrete is reinforced and the steel resists the tensile and flexural loads). Note that the retention wall does not have the function of preventing the migration of contamination its function is purely to prevent the erosion of the cap material.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Cap footprint reduced by approximately 55%. • Need for 3:1 slopes to eliminate cap erosion. • Retention walls are easily accessible for inspection. • Project can be interrupted should budget constraints occur. • Project can be started early ahead of cap design. • MDA-A and MDA-T can be managed separately. • Procurement competition between the MDAs. • Opportunity to do each project in different financial years. • D&D materials may be placed behind the retention wall. • Inspection of the retaining walls is readily available. • Wall can be easily and economically repaired. • Additional fill volume not required to adjoin MDA areas. • Both MDA can be joined in future to place D&D debris. • Anchoring of the wall is unnecessary to negate slip due to the contiguous design of the wall.	• 1,000-year longevity justification. • Use of natural rock to build an adjacent or future wall. • Use of a replacement/redundant wall may need to be considered • Concrete and/or coatings technology – slow progress

IDENTIFIED RISKS:

Materials cannot be obtained and/or formed locally. Concrete technology does not allow justifiable extended concrete life.

Note: This proposal is mutually exclusive with proposal 1, 3 and 4.

COST COMPARISON FOR PROPOSAL NO. 2

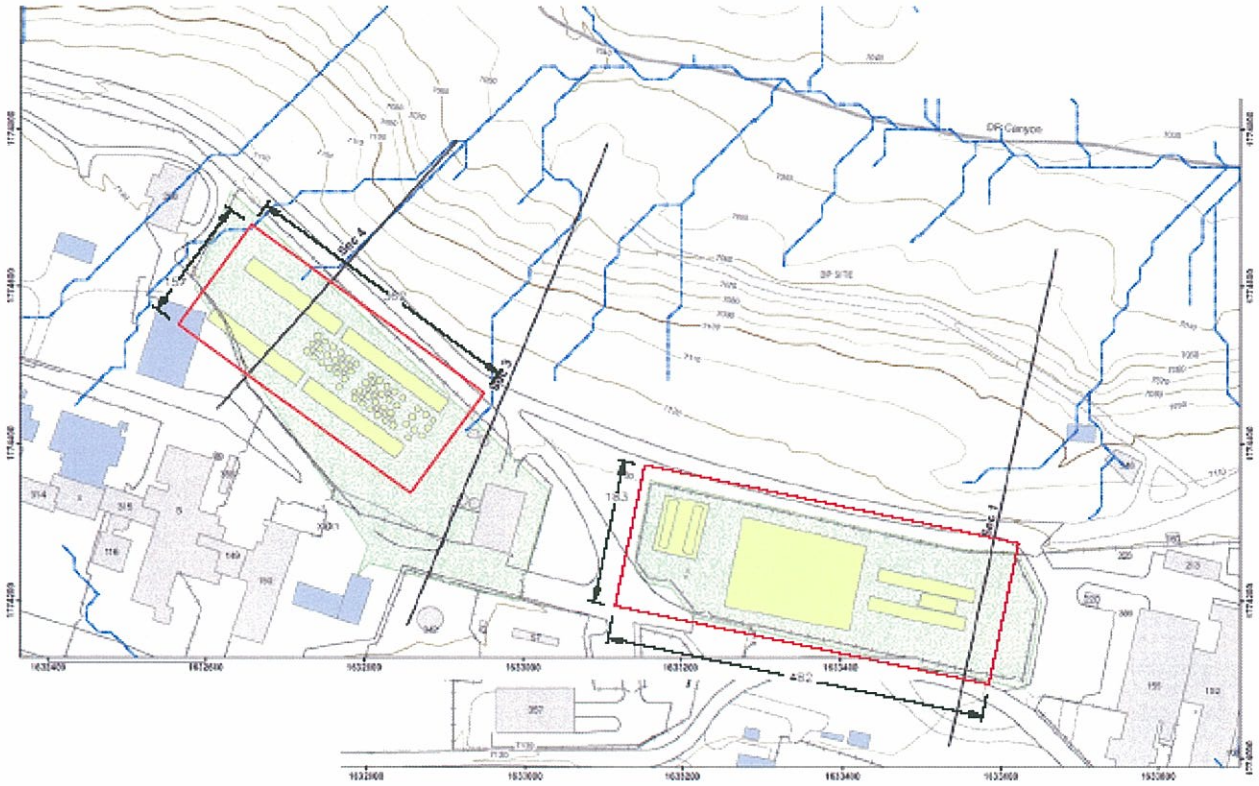
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
Construct cap using 3:1 slopes and embed toes of slope protection.	Construct cap and use a retention barrier to reduce fill and area required.

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	$13,700,000	
VALUE CONCEPT (-)	$11,100,000	
SAVINGS	$2,600,000	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	$2,600,000	
IMPLEMENTATION COSTS(-)	$11,100,000	
NET SAVINGS	$2,600,000	

Notes:

Figure 2-1. Proposal 2 – Wall Specific to each MDA



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DESCRIPTION - VALUE STUDY PROPOSAL NO. 2

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:

This VE study has proposed the use of a bare reinforced full or partial concrete retaining wall(s) around the cap of the MDAs.

Proposal:

Use an engineered reinforced concrete wall in place of a skirt around the individual caps for MDA-A and MDA-T to reduce the footprint of the cap and reduce the amount of fill required.

Assumptions:

There is abundant documentation available to predict a minimum life expectancy of 500 years for the concrete wall. The regulatory guidance specifies a 100-year active surveillance and maintenance period and then 900 years of passive containment. This proposal assumes that the concrete will meet that requirement. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

IMPLEMENTATION OF PROPOSAL NO. 2

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

The physical configuration of the wall and the chemical composition of the cement must be carefully engineered.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

This proposal assumes that the concrete will meet the requirement for a 1000-year life. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

It is imperative to note that cracks in the concrete will not result in its failure to meet its design function.

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

LANL should contract the services of people or entities with extensive knowledge of the design and chemistry of concrete systems to take the lead on this proposal.

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 3

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cap	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 3. RETENTION BARRIERS – SPECIFIC TO EACH MDA – CLOSE PROXIMITY
(Formerly Concept Q)

This proposal investigates the cost range for two engineered covers one over MDA-T and the other over MDA-A waste regions. To remove the need for a gradual declination of both caps due to the sharp fall off in the north region and also the lesser requirement for 'fall off' on the south side this proposal considers the use of two (2) separate retaining walls of appropriate height to provide appropriate erosion mitigation of both caps for the 1,000 year life. In this case the locations of these retention walls are within close proximity of the identified waste locations.

The caps will extend to over the current perimeters of the two waste regions approximately and average of 25 ft. The cap for MDA- T will be approximately 400 ft x 160 ft and for MDA-A 500 ft x 160 ft. All materials used in the cap are to be obtained locally and assumed to be suitable. All retaining walls will traverse the perimeters of MDA-T and MDA-A and enclose them totally being approximately 1 ft and 7 ft thick at the top and bottom respectively and have a height of approximately 10 ft. The walls will be built to appropriate ACI/ASTM/DoE standards to support longevity with the application of appropriate surveillance and timely repair. (Reinforced concrete cracks due to aging, settlement, and corrosive environs and one cannot really prevent this. That is why concrete is reinforced and the steel resists the tensile and flexural loads). Note that the retention wall does not have the function of preventing the migration of contamination its function is purely to prevent the erosion of the cap material.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Cap footprint reduced by approximately 65%. • Need for 3:1 slopes to eliminate cap erosion. • Retention walls are easily accessible for inspection. • Project can be interrupted should budget constraints occur. • Project can be started early ahead of cap design. • MDA-A and MDA-T can be managed separately. • Procurement competition between the MDAs. • Opportunity to do each project in different financial years. • D&D materials may be placed behind the retention wall. • Inspection of the retaining walls is readily available. • Wall can be easily and economically repaired. • Additional fill volume not required to adjoin MDA areas. • Both MDA can be joined in future to place D&D debris. • Anchoring of the wall is unnecessary to negate slip due to the contiguous design of the wall.	• 1,000-year longevity justification. • Use of natural rock to build an adjacent or future wall. • Use of a replacement/redundant wall may need to be considered • Concrete and/or coatings technology – slow progress

IDENTIFIED RISKS:

- Materials cannot be obtained and/or formed locally. Concrete technology does not allow justifiable extended concrete life.
- Investigation into the spread of contamination from the actual buried waste may negate this option if found to be out-with the proposed perimeter

Note: This proposal is mutually exclusive with proposal 1, 2 and 4.

COST COMPARISON FOR PROPOSAL NO. 3

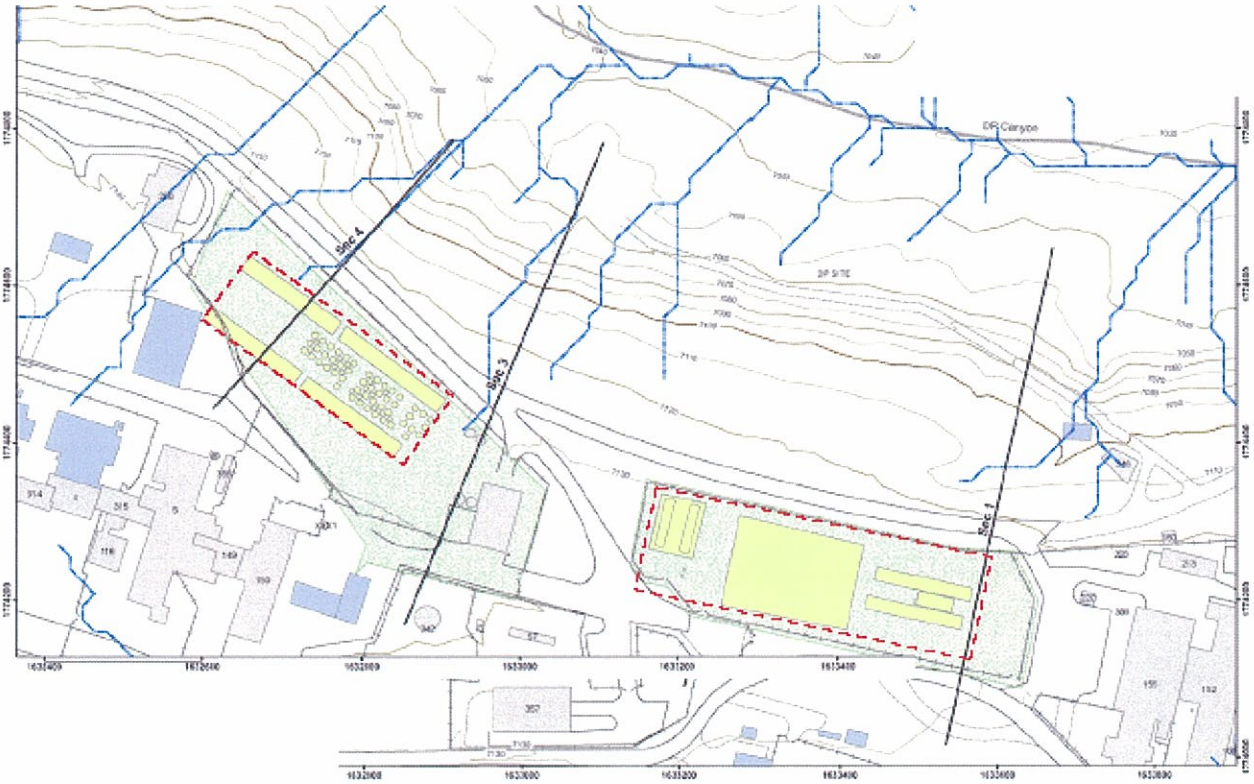
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
Construct cap using 3:1 slopes and embed toes of slope protection.	Construct cap and use a retention barrier to reduce fill and area required in close proximity to waste.

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	$13,700,000	
VALUE CONCEPT (-)	$9,300,000	
SAVINGS	$4,400,000	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	$4,400,000	
IMPLEMENTATION COSTS(-)	0	
NET SAVINGS	$4,400,000	

Notes:

Figure 3-1. Proposal 3 – Wall Specific to Each MDA –Close Proximity



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DESCRIPTION- VALUE STUDY PROPOSAL NO. 3

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:

This VE study has proposed the use of a bare reinforced full or partial concrete retaining wall(s) around the cap of the MDAs.

Proposal:

Use an engineered reinforced concrete wall in place of a skirt around the individual caps for MDA-A and MDA-T but in close proximity to further reduce the footprint of the cap and reduce the amount of fill required.

Assumptions:

There is abundant documentation available to predict a minimum life expectancy of 500 years for the concrete wall. The regulatory guidance specifies a 100-year active surveillance and maintenance period and then 900 years of passive containment. This proposal assumes that the concrete will meet that requirement. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

IMPLEMENTATION OF PROPOSAL NO. 3

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

The physical configuration of the wall and the chemical composition of the cement must be carefully engineered.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

This proposal assumes that the concrete will meet the requirement for a 1000-year life. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

It is imperative to note that cracks in the concrete will not result in its failure to meet its design function.

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

LANL should contract the services of people or entities with extensive knowledge of the design and chemistry of concrete systems to take the lead on this proposal.

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 4

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cap Design	**FUNCTION:**	Prevent Intrusion

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 4. USE CONCAVE VERSUS MOUNDED CAP DESIGN
(Formerly Concept S)

Moisture retention is critical maintaining the integrity of an ET cap in arid regions. This is especially true in Los Alamos where the annual evaporation rate (54") is roughly three times the annual precipitation of 18.6". The traditional mound design for disposal site caps encourages water runoff rather than absorption. This proposal would use a concave cap to create a dish, which would encourage absorption and retention of the needed moisture. It would also help to reduce erosion from sheet flow and channeling. Figure 1 presents this concept in pictorial form. This concept would reduce the requirement for capping material by approximately 20,500 cubic yards. This is from eliminating 13,600 cubic yards from the top of the mound and another 6800 cubic yards from the base.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Reduce cost • Reduce schedule • Improve moisture retention	• Possibility of retaining too much water.

IDENTIFIED RISKS:

Potential to retain excessive amounts of water is considered to be a minimal risk

Note: This proposal is independent of other proposals.

COST COMPARISON FOR PROPOSAL NO. 4

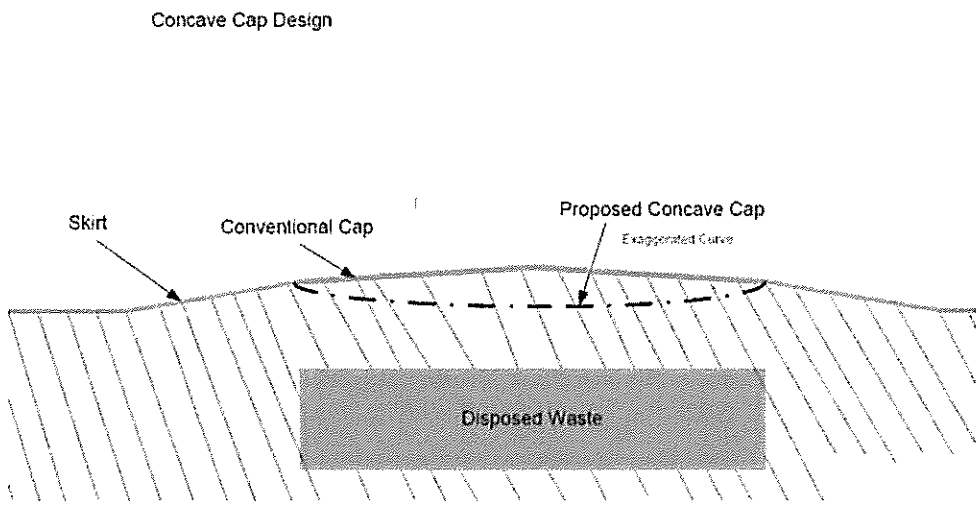
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
Mounded cap	Concave cap

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	$681,500	NA
VALUE CONCEPT (-)	$272,600	
SAVINGS	$408,900	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	$408,900	
IMPLEMENTATION COSTS(-)		
NET SAVINGS	$408,900	

Notes:

Figure 4-1. Proposal 4 – Concave Cap



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ALTERNATIVE EVALUATION FOR PROPOSAL NO. 5

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	MDA Closure	**FUNCTION:**	Contamination Control

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 5. ENHANCED RETAINING WALL
(Formerly Concept T)

This VE study has proposed that a reinforced concrete retaining wall be erected around the MDAs instead of the sloped ET cap skirt. There is a concern that the concrete retaining wall may not withstand the 1000-year confinement period. Therefore reinforcing the wall with stacked boulders or gabion structures is being considered. Figure 1 is a picture of a gabion structure. The gabion is essentially a heavy gauge woven wire basket filled with rocks.

This concept has been examined in a parametric fashion. It considers the costs for: concrete only, concrete with gabion facing, concrete with rock (boulders) facing, Gabion only walls and rock only walls. These costs are for the wall only. They do not include any other project costs. Table 1 summarizes the costs for these alternate material designs for each of 4 different wall configurations. Tables 2 through 5 provide the details of the cost elements. Table 6 provides a comparison of the advantages and disadvantages of the different design while the comparison below addresses only the base case, which is a full perimeter wall around both MDA-A and MDA-T.

ADVANTAGES / BENEFITS	DISADVANTAGES
• The enhanced wall would be more resistant to erosion from wind and water. • The enhanced wall may offer improved protection in the event of a seismic event. • The facing material could act as a sacrificial coating for the concrete wall.	• Significant increase in cost. • The enhanced wall would increase the footprint of the MDAs. • The enhanced wall would still leave open pathways in the event of cracking unless the facing material was cemented together which makes it the same as concrete.

IDENTIFIED RISKS:

None identified

Note: This proposal is independent of other proposals

COST COMPARISON FOR PROPOSAL NO. 5

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
Concrete wall with rock facing	Concrete wall without facing

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	$5,382,254	
VALUE CONCEPT (-)	$3,869,444	
SAVINGS	$1,5112,810	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	$1,512,810	
IMPLEMENTATION COSTS(-)	NA	
NET SAVINGS	$1,512,810	

Notes:

Figure 5-1. Proposal 5 – Gabion Structure

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Design Concept	Advantages	Disadvantages
Concrete Only	1) Lowest cost for caisson wall 2) Second lowest cost for full perimeter wall 3) Smallest footprint 4) Lowest potential for accidents or worker injuries	1) May crack over time
Concrete/Gabion Face	1) Improved resistance to erosion 2) Easier to construct than rock face	1) Highest cost in all cases 2) Unknown period of performance. Estimated to be at least 100 years
Concrete/Rock Face	1) Improved resistance to erosion 2) Lower cost than gabion face	1) Requires higher skill sets for construction 2) Highest potential for worker injuries
Gabion Only	1) Simplest wall to construct 2) Aesthetically pleasing appearance	1) More expensive than "rock only" in all cases 2) Undetermined life expectancy. 3) Copious interstitial void spaces
Rock Only	1) Lowest cost in 3 out of 4 cases 2) Natural appearance when completed 3) Greatest life expectancy of all of the cases	1) Copious interstitial void spaces will permit migration of the cap materials through the wall. 2) Construction will require a high degree of skill 3) Construction schedule will be dependent on the design as you go nature of placing random rock shapes.

CONSTRUCTION COST COMPARISONS					
WALL DESIGN OPTIONS	CONCRETE ONLY	GABION FACE	ROCK FACE	GABION ONLY	ROCK ONLY
NORTH WALL ONLY	$ 3,000,000	$ 4,372,500	$ 3,976,240	$ 2,938,500	$ 2,089,153
FULL PERIMETER WALL	$ 3,869,444	$ 5,836,694	$ 5,382,254	$ 4,211,850	$ 3,237,413
CAISSON WALL	$ 1,750,000	$ 3,122,500	$ 2,726,240	$ 2,938,500	$ 2,089,153
TOE WALL	$ 888,889	$ 1,295,556	$ 1,178,145	$ 870,667	$ 619,008

North Wall Only											% Increase
	Cost/CY $	Area ft2	Length ft	Volume CY	Cost $	**Gabion Face 7.5' base 12' high**	Length ft	Height ft	Cost/Sq. Ft.	Cost	
20' high x 12' base	500	120	1,350	6,000	3,000,000	Gabion Cost	1,350	20	$ 51	$ 1,372,500	
Wall Cost					$3,000,000	**Total Cost Wall + Gabion =**				**$4,372,500**	46%
Full Perimeter Wall No Skirt											
20' high x 12' base	500	120	1,150	5,111	2,555,556	Gabion Cost	1,150	20	$ 51	$ 1,169,167	
West Wall	500	85	160	504	251,852	Gabion Cost	160	10	$ 51	$ 81,333	
East Wall	500	85	160	504	251,852	Gabion Cost	160	10	$ 51	$ 81,333	
10' high x 7' base	500	35	1,250	1,620	810,185	Gabion Cost	1250	10	$ 51	$ 635,417	
Total Wall Cost			2,720		$3,869,444	**Total Gabion Cost =**				**$1,967,250**	
						Total Cost Wall + Gabion =				**$5,836,694**	51%
Cassion Wall											
MDA-A											
10' high x 7' base	500	35	1,400	1,815	907,407	Gabion Cost	1,400	10	$ 51	$ 711,667	
MDA-T										$ -	
10' high x 7' base	500	35	1,300	1,685	842,593	Gabion Cost	1,300	10	$ 51	$ 660,833	
Total Wall Cost					$1,750,000	**Total Gabion Cost =**				**$ 1,372,500**	
						Total Cost Wall + Gabion =				**$3,122,500**	78%
Toe Wall											
	Cost/CY $	Area SF	Length ft	Volume CY	Cost $						
20' high x 12' base	500	120	400	1,778	888,889	Gabion Cost	400	20	$ 51	$ 406,667	46%
Toe Wall Cost					$888,889	**Total Cost Wall + Gabion =**				**$ 1,295,556**	

AVERAGE INCREASE FOR GABION FACE = 55%

North Wall Only													
	Cost/CY $	Area ft2	Length ft	Volume CY	Cost $	Face 3' base 20' high	Length ft	Height ft	Area Ft²	Tons	Cost/ton	Cost	% Incre
20' high x 12' base	500	120	1,350	6,000	$ 3,000,000	Rock Cost	1,350	20	27,000	5579	$ 175	$ 976,240	
Wall Cost					$ 3,000,000	Total Cost Wall + Rock =						$3,976,240	33%
Full Perimeter Wall No Skirt													
20' high x 12' base	500	120	1,150	5,111	2,555,556	Rock Cost	1,150	20	23,000	4752	$ 175	$ 831,612	
West Wall	500	85	160	504	251,852		160	12	1,920	397	$ 175	$ 69,421	
East Wall	500	85	160	504	251,852		160	12	1,920	397	$ 175	$ 69,421	
10' high x 7' base	500	35	1,250	1,620	810,185		1250	12	15,000	3099	$ 175	$ 542,355	
Total Wall Cost			2,720		$3,869,444	Total Cost Wall + Rock =						$5,382,254	39%
Cassion Wall													
MDA-A													
10' high x 7' base	500	35	1,400	1,815	907,407	Rock Cost	1,400	10	14,000	2893	$ 175	$ 506,198	
MDA-T													
10' high x 7' base	500	35	1,300	1,685	842,593	RockCost	1,300	10	13,000	2686	$ 175	$ 470,041	
Total Wall Cost					$1,750,000	Total Cost Wall + Rock =						$2,726,240	56%
Toe Wall													
	Cost/CY $	Area SF	Length ft	Volume CY	Cost $								
20' high x 12' base	500	120	400	1,778	888,889	Rock Cost	400	20	8,000	1653	$175	$ 289,256	
Toe Wall Cost					$888,889	Total Cost Wall + Rock =						$1,178,145	33%
	Rock Physical Data Assumptions					**AVERAGE INCREASE FOR ROCK FACE =**							**40%**
	Density = 140#/cu ft												
	Average thickness = 3 ft												
	Rocks 2.2'x2.2'x3'/to		4.84	sq ft/ton									

North Wall Only										
	Cost/CY $	Area ft2	Length ft	Volume CY	Cost $	**Gabion Face 7.5' base 12' high**	Length ft	Height ft	Cost/Sq. Ft.	Cost
20' high x 12' base	500	120	0	0	0	Gabion Cost	1,350	20	$ 109	$ 2,938,500
Wall Cost					$0	**Total Cost Wall + Gabion =**				**$2,938,500**
Full Perimeter Wall No Skirt										
20' high x 12' base	500	120	0	0	0	Gabion Cost	1,150	20	$ 109	$ 2,503,167
West Wall	500	85	0	0	0	Gabion Cost	160	10	$ 109	$ 174,133
East Wall	500	85	0	0	0	Gabion Cost	160	10	$ 109	$ 174,133
10' high x 7' base	500	35	0	0	0	Gabion Cost	1250	10	$ 109	$ 1,360,417
Total Wall Cost			0		$0	**Total Gabion Cost =**				**$4,211,850**
						Total Cost Wall + Gabion =				**$4,211,850**
Cassion Wall										
MDA-A										
10' high x 7' base	500	35	0	0	0	Gabion Cost	1,400	10	$ 109	$ 1,523,667
MDA-T										$ -
10' high x 7' base	500	35	0	0	0	Gabion Cost	1,300	10	$ 109	$ 1,414,833
Total Wall Cost					$0	**Total Gabion Cost =**				**$ 2,938,500**
						Total Cost Wall + Gabion =				**$2,938,500**
Toe Wall										
	Cost/CY $	Area SF	Length ft	Volume CY	Cost $					
20' high x 12' base	500	120	0	0	0	Gabion Cost	400	20	$ 109	$ 870,667
Toe Wall Cost					$0	**Total Cost Wall + Gabion =**				**$ 870,667**

North Wall Only												
	Cost/CY $	Area ft2	Length ft	Volume CY	Cost $	Face 3'	Length ft	Height ft	Area Ft^2	Tons	Cost/ton	Cost
						base 20'						
						high						
20' high x 12' base	500	120	0	0	$ -	Rock Cost	1,350	20	27,000	11938	$ 175	$2,089,153
Wall Cost					$ -	Total Cost Wall + Rock =						$2,089,153

Full Perimeter Wall No Skirt												
20' high x 12' base	500	120	0	0	0	Rock Cost	1,150	20	23,000	10169	$ 175	$1,779,649
West Wall	500	85	0	0	0		160	12	1,920	849	$ 175	$ 148,562
East Wall	500	85	0	0	0		160	12	1,920	849	$ 175	$ 148,562
10' high x 7' base	500	35	0	0	0		1250	12	15,000	6632	$ 175	$1,160,640
Total Wall Cost			0		$0	Total Cost Wall + Rock =						$3,237,413

Cassion Wall												
MDA-A												
10' high x 7' base	500	35	0	0	0	Rock Cost	1,400	10	14,000	6190	$ 175	$1,083,264
MDA-T												
10' high x 7' base	500	35	0	0	0	RockCost	1,300	10	13,000	5748	$ 175	$1,005,888
Total Wall Cost					$0	Total Cost Wall + Rock =						$2,089,153

Toe Wall												
	Cost/CY $	Area SF	Length ft	Volume CY	Cost $							
20' high x 12' base	500	120	0	0	0	Rock Cost	400	20	8,000	3537	$175	$ 619,008
Toe Wall Cost					$0	Total Cost Wall + Rock =						$ 619,008

	Rock Physical Data Assumptions											
	Density = 140#/cu ft											
	Average thickness = 3 ft											
	Rocks 2.2'x2.2'x3'/ton		4.84	sq ft/ton								

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 6

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Performance Monitoring	**FUNCTION:**	Identify migration of contaminates

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 6. HORIZONTAL MONITORING WELLS
(Formerly Concept K)

Use horizontal bore holes from north face of mesa as monitoring wells. Holes would be bored below and across the bottom elevation of the waste. Figure 1 shows the horizontal well concept. Figure 2 shows the traditional vertical monitoring well arrangement.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Improved opportunity for detecting contaminates migration. • Requires fewer wells.	• Non-conventional approach to monitoring. • More difficult to access well heads.

IDENTIFIED RISKS:

None noted.

Note: This proposal is independent of other proposals.

COST COMPARISON FOR PROPOSAL NO. 6

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
The original concept would use 132 vertical monitoring wells. They would be 4-inch diameter, 150 feet deep spaced at 50-foot intervals around the perimeter of the MDAs. The wells would be monitored on a quarterly basis. Figure 2 shows the standard well configuration.	The value concept would use 64 horizontal wells drilled beneath the waste in MDA-A and MDA-T. The wells would be 50 feet apart and would extend 500 feet horizontally under the MDAs. Figure 1 shows the proposed horizontal well configuration.

COST ITEMS	NONRECURRING	LIFE CYCLE
VERTICAL WELLS	$594,000	$7,392,000
HORIZONTAL WELLS	$1,056,000	$3,584,000
SAVINGS	($462,000)	$3,808,000
NUMBER OF UNITS (X)	1	1
TOTAL SAVINGS	($462,000)	$3,808,000
IMPLEMENTATION COSTS(-)		($462,000)
NET SAVINGS	($462,000)	$3,346,000

Notes:

Figure 6-1. Proposal 6 – Vertical Well Placement

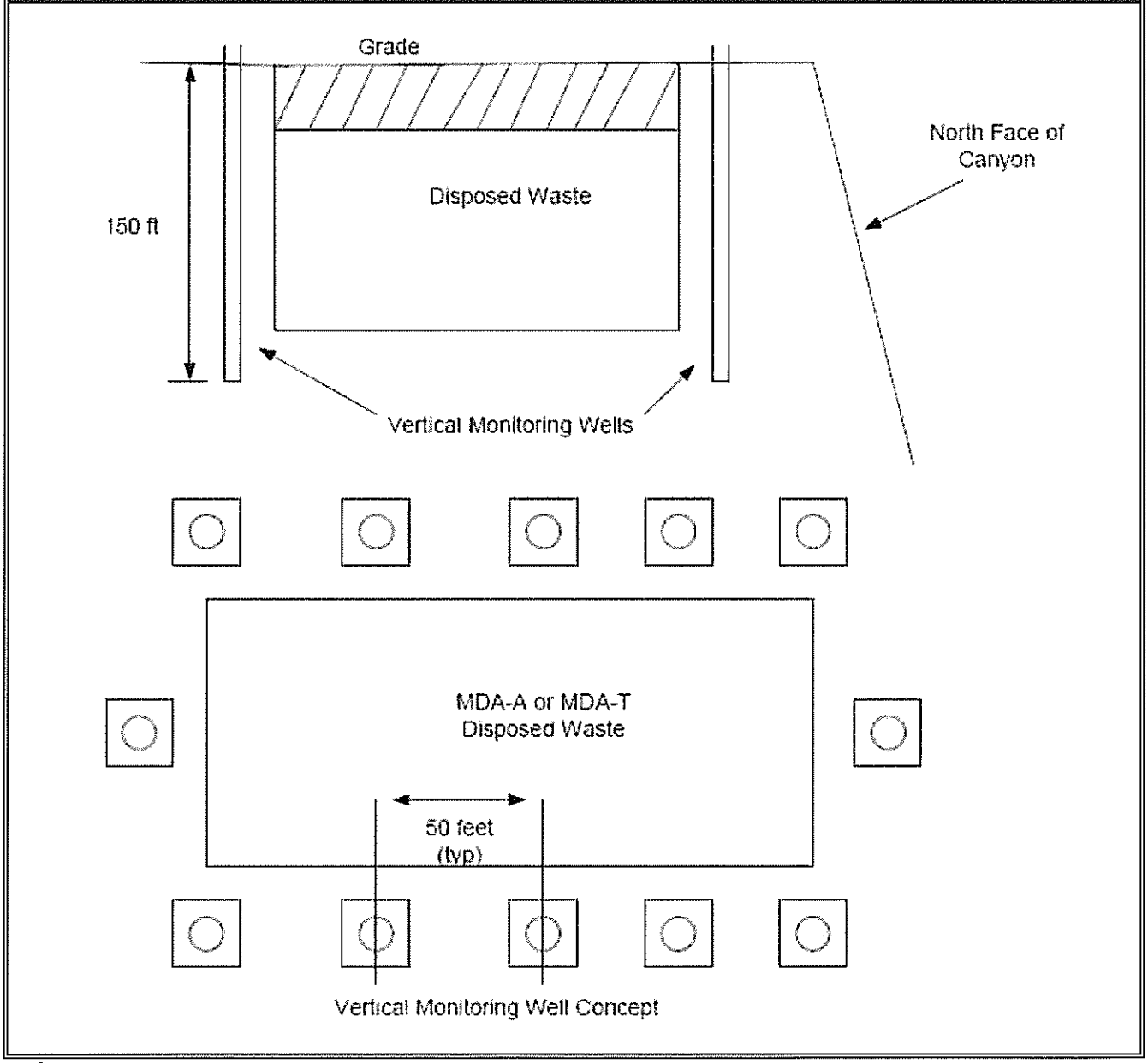

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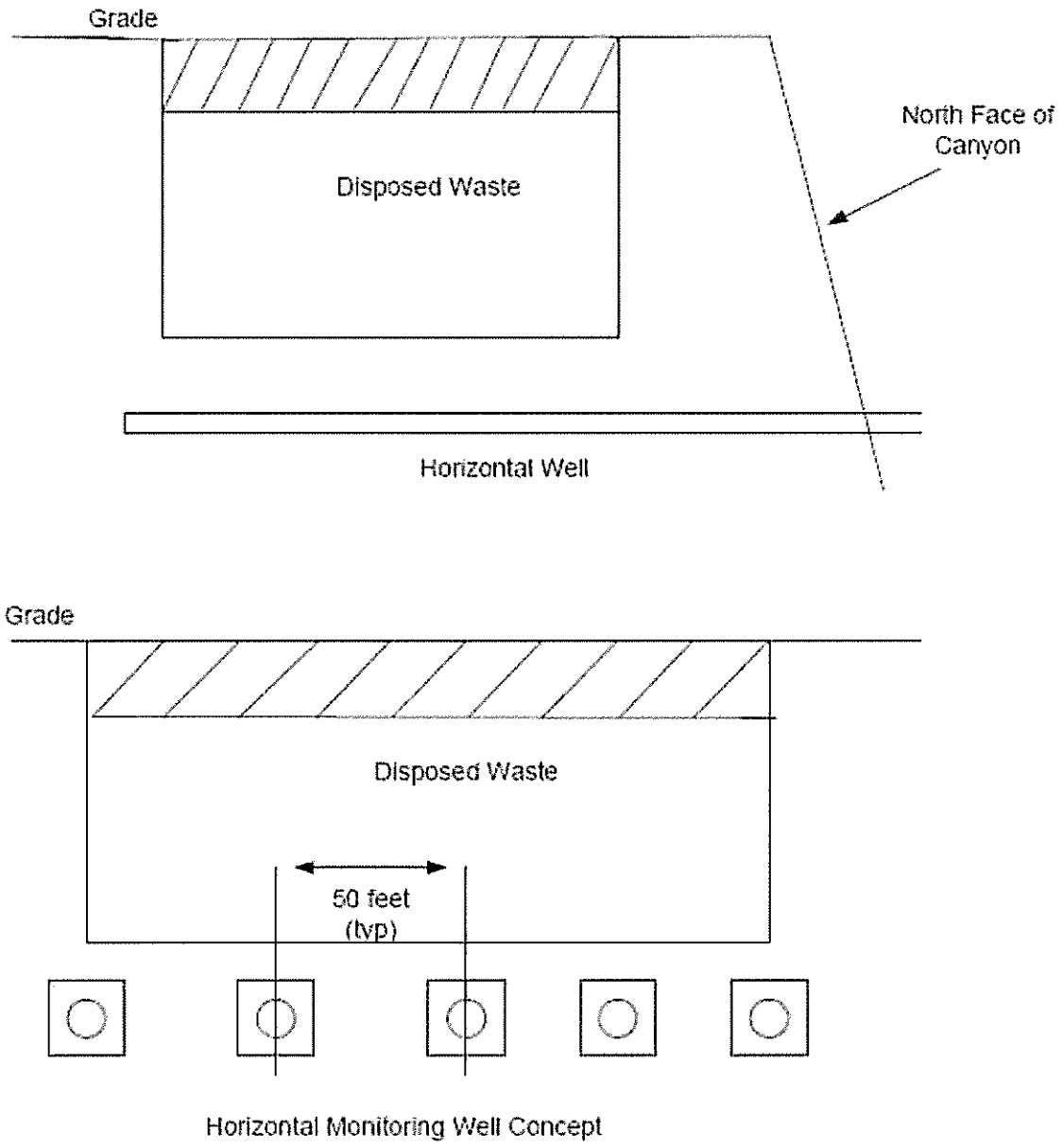
Figure 6-2. Proposal 6 - Horizontal Well Placement



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DESCRIPTION- VALUE STUDY PROPOSAL NO. 6

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:
The current plan does not include provisions for any monitoring wells around the MDAs. There are adequate reasons for installing these wells. Currently there are only 32 deep wells and 51 shallow wells to monitor contamination transfer at the entire Los Alamos site. Previous studies, "Plutonium and the Rio Grande, Environmental Change and Contamination In The Nuclear Age" William L. Graf, 1994, have shown that contamination is moving on and around the Los Alamos site. Regulatory guidance, 40CFR258 and 10 CFR 61.53 and engineering prudence dictate that waste disposal sites should be monitored to detect any migration at the earliest possible time.

Proposal:
Conventional technology for monitoring wells is to drill vertical shafts as close as practical to the disposed waste. The spacing and depth of these shafts are determined by the specific site conditions. As an example the wells are spaced approximately 50 feet apart at the Chemical-Nuclear disposal site in Barnwell, S.C. Using this spacing would require about 132 wells to monitor MDA-A and MDA-T. The wells would be 150 to 200 feet deep.

We are proposing to install 32 wells drilled horizontally beneath the waste at these MDAs. The unique topography of the TA - 21 site will allow this configuration. The result will be a more comprehensive monitoring system at a lower cost.

Assumptions:
Contamination has moved down from the absorber beds and vertical shafts and will continue to do so. Quantifying the concentrations and transfer rates will allow planning for future effective remediation.

Vertical Well Costs: Drilling; (132 wells)(150 ft)($30/ft) = $528,000
Monitoring; (132 wells)(1tech.)(2hrs/well) ($70/hr) (4 checks/year) (100yrs) = $7,392,000

Horizontal Well Costs: Drilling; (64 wells) (500 ft) ($33/ft) =$1,056,000
Monitoring; (64wells)(1tech.)(2hrs/well) ($70/hr) (4 checks/year) (100yrs) = $3,584,000

IMPLEMENTATION OF PROPOSAL NO. 6

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

The number and spacing of the wells needs to be determined. This proposal uses assumed spacing based on a South Carolina LLRW site.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 7

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cover System	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 7. PLACEMENT OF D&D DEBRIS IN GAP BETWEEN MDA A&T
(Formerly Concept A)

This proposal considers combining both the MDA A and MDA T areas with a single earthen cover and using the gap between them for waste storage and then disposal. The cover would be configured as a smooth arc (see figure). A longitudinal gap exists between the A and T areas, which ranges from 125-150 ft. in length. This gap has not previously been used for waste disposal. However, examination has shown that it could provide additional volume for waste disposal for the demolition debris associated with the D&D of the TA-21 area. Scoping calculations indicate that approximately 5,000 cubic yards of debris could be placed within this void. This is waste material that would otherwise be destined for off-site disposal. The costs associated with the packaging, transport to a disposal site, and eventual of site disposal are considerable. Of particular interest is the soil and metallic debris from TA-21 D&D. This debris represents a significant percentage of the TA-21 D&D cost and considerable savings could be realized if a portion of it could be incorporated within the earthen cover.

The current funding situation for D&D at LASL is such that the TA-21 D&D operations, followed by the construction by the MDA capping may be stretched out. It is anticipated that the existing space between the two MDAs would be needed for interim lag storage of the debris while awaiting construction of the cover. This situation was used to evaluate the cost savings associated with the TA-21 D&D.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Cost savings associated with safe on-site disposal of TA-21 D&D debris • Integration of D&D operations with the construction of the MDA cover improves continuity in TA-21 operations	• Possible scarcity of operational space associated with TA-21 D&D requires more LASL oversight of TA-21 D&D to ensure site safety

IDENTIFIED RISKS:

- Possible regulatory concerns over on-site lag storage of D&D debris awaiting construction of MDA earthen cover
- The high void volume in certain types of metallic waste will require that it be compacted to prevent eventual settlement of the cover

Note: This proposal is independent of other proposals.

COST COMPARISON FOR PROPOSAL NO. 7

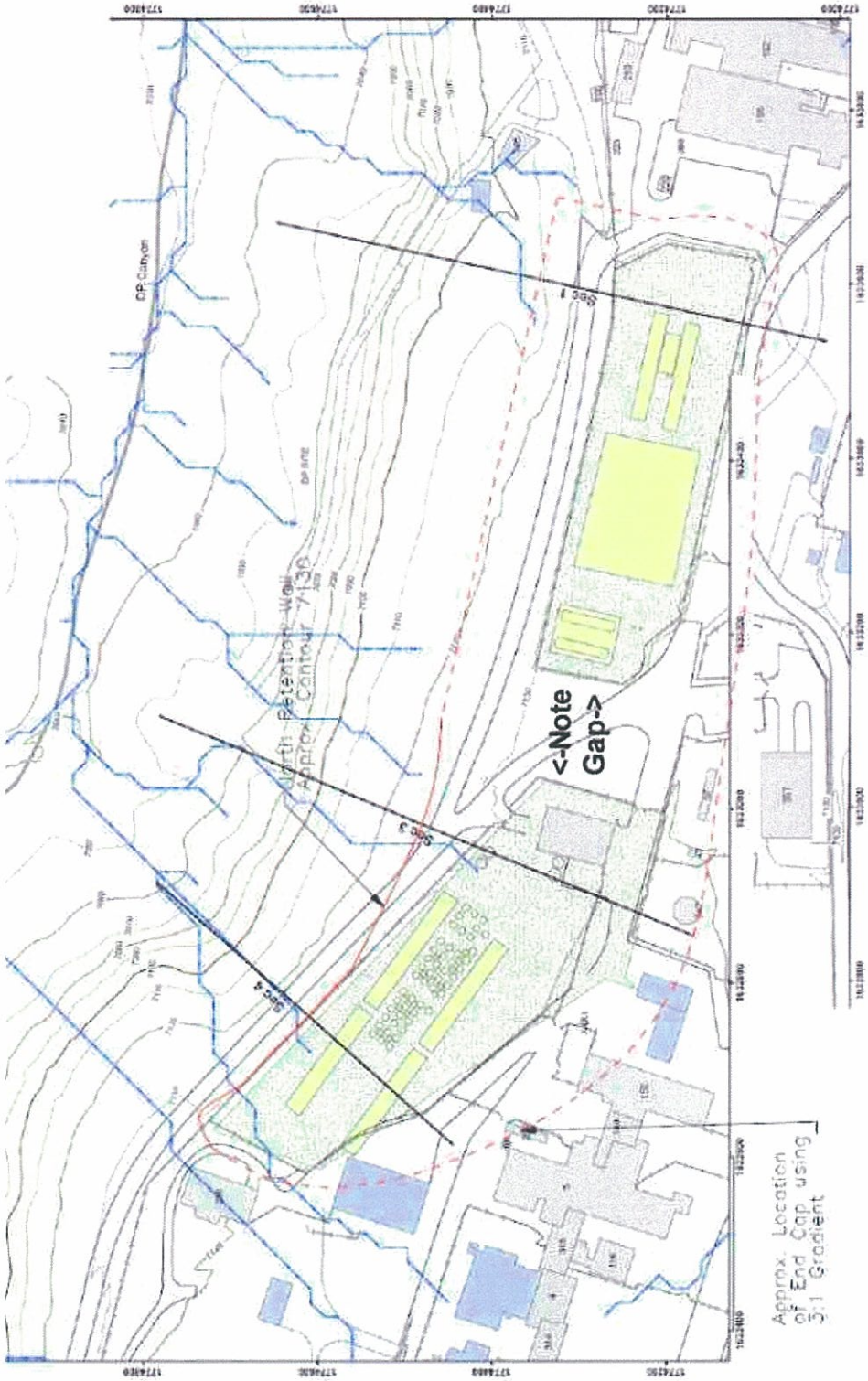
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
Baseline cover design for this study is a combined MDA earthen cover with fill soil in the gap between A and T areas	In the combined cover, the gap between the A&T MDAs is filled with contaminated debris from TA-21 demolition

COST ITEMS	NONRECURRING HIGH	NONRECURRING LOW
ORIGINAL CONCEPT		
VALUE CONCEPT (-)		
SAVINGS	$1,800,000	$800,000
NUMBER OF UNITS (X)	1	1
TOTAL SAVINGS	$1,800,000	$800,000
IMPLEMENTATION COSTS(-)		
NET SAVINGS	$1,800,000	$800,000

Notes:

Figure 7-1. Proposal 7 - Gap Debris Placement



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DESCRIPTION- VALUE STUDY PROPOSAL NO. 7

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:

The study considered combining the two MDA waste disposal areas with a single earthen cover system. Since the MDAs are separated in the E-W direction, a void space exists which would require filling with fill soil. A cost saving alternative is placement of contaminated waste resulting from the D&D of TA-21 facilities in this void volume. Previous studies have shown that the cost of packaging, transport and off site disposal ranges between $xxx to $xxx for contaminated waste at either the NTS or Energy Solutions, Utah.

Proposal:

A cost saving of approximately $1,800,000 is realized for on-site disposal when compared to the cost for packaging, transport, and off site disposal.

Assumptions:

1. Lag storage of D&D debris is approved by LASL to accommodate construction dates for MDA earthen cover.
2. Disposal of metallic waste, if considered, will require some degree of compaction for on-site disposal in the cap void area. Compaction will be necessary to prevent any settlement of the cover. . Compaction using a "sheep's-foot" roller should be sufficient.

IMPLEMENTATION OF PROPOSAL NO. 7

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

What demolition debris will be placed in the gap between the two MDAs? Consideration should be given to the waste material types, which have the highest economic impact when compared to off site disposal.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

Approval for the means and actual material planned for lag storage followed by disposal within the combined MDA cover is needed. Lag storage would require a temporary cover to prevent water infiltration and segregation from the waste already buried in the contiguous MDAs. This isolation would typically be accomplished by coverage with a temporary liner (possibly HDPE) and leachate collection/drainage channels being lead to a common area for assay

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

LANL decides which waste can either be temporarily stored on-site awaiting construction of the cover and which wastes have the greatest economic benefit when compared to off site disposal costs

ESTIMATE WORKSHEET

SHEET 1 of 1

FEATURE: 28-Aug-07 Demolition between A&T	**PROJECT:** TA-21
Project: TA-21 Material Disposal Area Capping Concepts and Strategies	**DIVISION:**
Case: VST Alt. Proposal No. 5 Formerly Concept A	**UNIT:** TA-21-Closure Team

PLANT ACCT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	ASSUMPTIONS						
		1. Void Volum (150ft x 150ft x 6ft deep)(27 cf/y)		5,000	CY		
		2. Fill Cost		5,000	CY	20.00	100,000
		3. Packaging, transport, disposal cost to NTS (NTS disposal - $0/cf)					
		metal			cf	23.70	
		soil			cf	9.97	
		misc debris			cf	5.45	
		4. Demolition debris volumes available					
		metal		2131	cy	639.9	1,363,627
		soil		3897	cy	269.19	1,049,033
		misc debris		1342	cy	147.15	197,475
		5. Cost of LAG Storage					
		(150ft x 150ft)		22500	sf	20.00	450,000
	VALUE STUDY CONCEPT:						
		Case A - high estimate					
		- fill cost credit		5,000	CY	20.00	100,000
		- metal PTD		2,131	cy	639.9	1,363,627
		- soil PTD		2,869	cy	269.19	772,306
		- LAG storage cost penalty		1	LS	-450000	(450,000)
		TOTAL SAVINGS:					**1,785,933**
		Case B - low estimate					
		- fill cost credit		5,000	CY	20.00	100,000
		- misc debris PTD		1,348	CY	147	198,358
		- metal PTD		0	cy	639.9	-
		- soil PTD		3,652	cy	269.19	983,082
		- LAG storage cost penalty		1	LS	-450000	(450,000)
		TOTAL SAVINGS:					**831,440**

QUANTITIES		PRICES	
BY bob anderson	CHECKED	BY bob anderson	CHECKED
DATE PREPARED 08/28/2007	APPROVED	DATE 08/28/2007	PRICE LEVEL

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 8

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cover system	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 8. COVER DESIGN BENEFICIAL RE-USE OF TA-21 MATERIALS - CONCRETE & SOIL *(Formally Concept E)*

Beneficial utilization of structural concrete from D&D of TA-21 facilities for construction of the on site TA-21 disposal facility earthen cover is proposed. Packaging, transport, and possibly disposal off-site at NTS presently represents a significant cost to LANL. Also, the costs of the MD&T, MDA-A on-site disposal areas associated with TA-21 D&D projects include the costs of the engineered cover and associated erosion control material. The beneficial re-use of this material will have a significant cost impact on the project. The intent of this proposal is to examine means of utilizing this material on-site while still meeting TA-21 earthen cap design objectives.

Construction of the MDA combined earthen cover proposal is that the bulk concrete will be fragmented into a suitable size so as to be useful as a bio intrusion layer or for erosion control for the sides of the earthen cap cover. Also, the concrete will have sufficiently low radioactivity to permit usage in the cover.

ADVANTAGES / BENEFITS	DISADVANTAGES
• The costs for packaging, transport and off site disposal (D&D) associated with the TA-21 demolished concrete debris is eliminated • The cost of purchasing and placement of material for the bio-intrusion layer is eliminated • Reduced transportation of material off-site improves Los Alamos traffic management concerns and is a benefit to local populace • Reduced labor and schedule time for packaging and preparing for off site transport work material	• Public perception and political concerns associated with not disposing waste away from New Mexico • Labor costs associated with scabbling concrete and radioactivity assay. • Possible need for safe on-site lag storage of concrete awaiting placement into earthen cover

IDENTIFIED RISKS:

Requirements for radioactivity assay of demolished concrete adds excessive costs to project.

COST COMPARISON FOR PROPOSAL NO. 8

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
- All of TA-21 demolished concrete waste from bldg D&D is packaged, transported and shipped for disposal and not incorporated in MDA cover.	- Re-use of building concrete is considered for use in the cover bio intrusion layer. Re-use eliminate the costs associated with off-site disposal.

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	6,028,000	

COST COMPARISON FOR PROPOSAL NO. 8

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

VALUE CONCEPT (-)	2,017,000	
SAVINGS	4,011,000	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	4,011,000	
IMPLEMENTATION COSTS(-)		
NET SAVINGS	4,011,000	

Notes:

COST COMPARISON	
Assumptions:	
Concrete scabbling cost	$2.00/sq ft
Concrete volume	13,258 cy
Concrete surface area assume 1 ft thick	359,966 sq ft
Concrete yield for disposal	90%
Concrete assay cost	$300/sample
Concrete sampling batch size	40,000 lb
No. samples/batch	2
Preliminary calculation results:	
Scabbling cost	$715,900
Assay cost	$724,400
Concrete rubble/segregation cost	$200,000

Figure 8-1. Proposal 8 – Wall Shaver

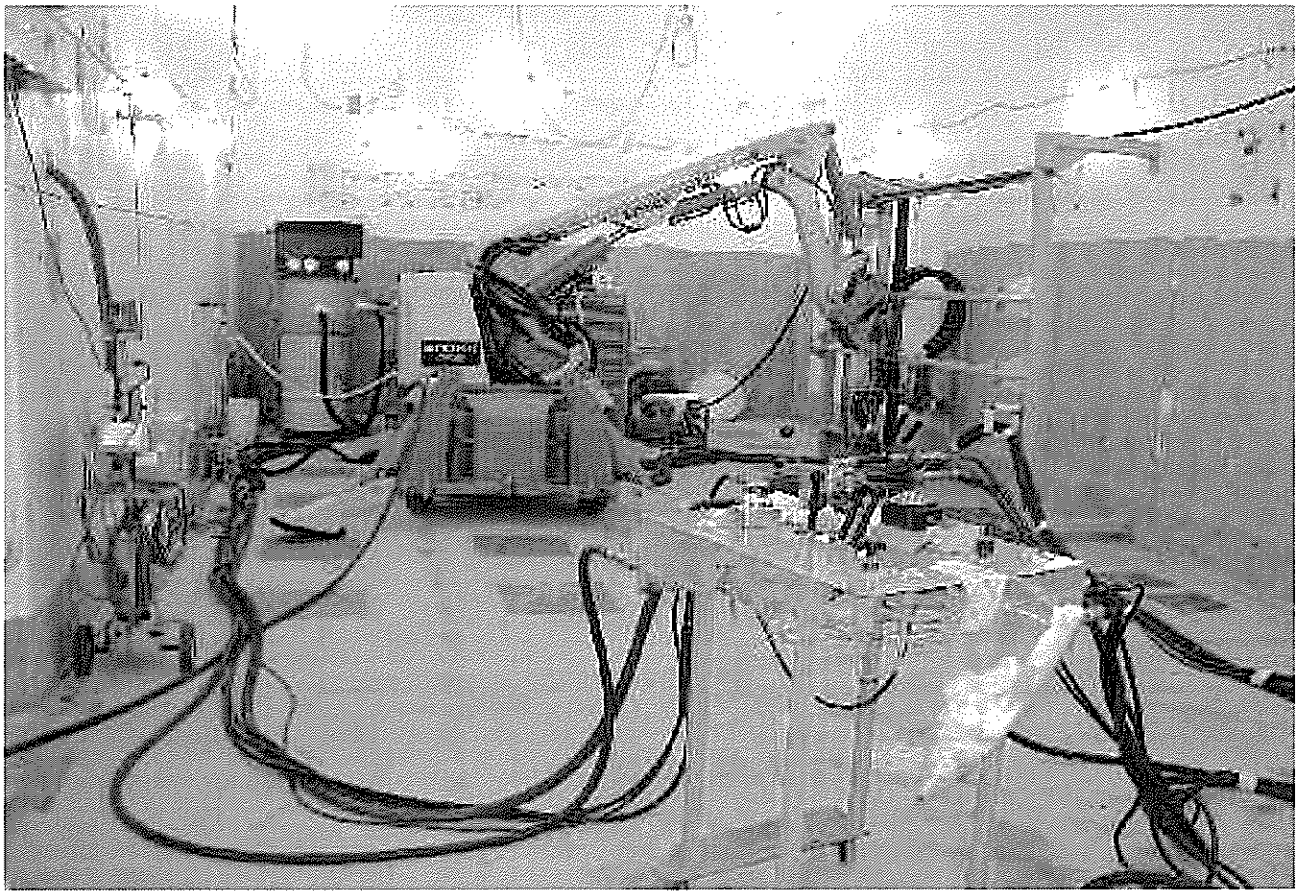

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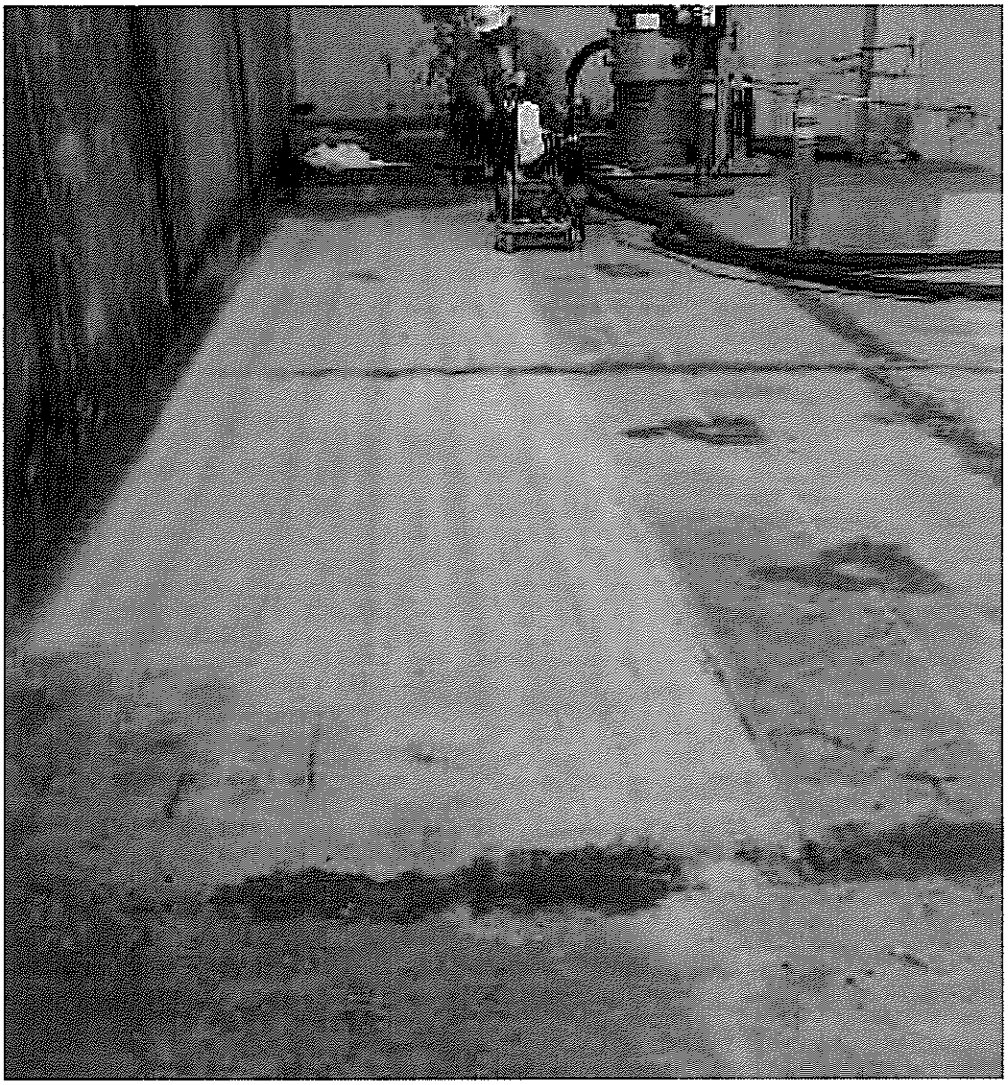
Figure 8-2. Proposal 8 – Wall Shaver



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DESCRIPTION- VALUE STUDY PROPOSAL NO. 8

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:
The earthen cover placement volume of rubblized concrete required is estimated to be ~10,500 - 11,000cy for the bio-intrusion layer.

Results:
The economic analysis shows that with a yield of 82-85% due to concrete scabbling and analysis, at a bio-intrusion layer of at 1.5-foot thickness is possible. If extra concrete is available for cobble, the layer thickness could be increased to utilized all available and approved concrete rubble. The cost analysis shows that a cost saving of a minimum of $3.75 million cost savings is possible.

Assumptions:
Cost for NTS disposal is zero dollars/cf when waste could be shipped to NTS.
Lag storage of demolished concrete is approved at the TA-21 site.
Radioactivity contamination assay costs can be controlled and are reasonable.

IMPLEMENTATION OF PROPOSAL NO. 8

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

- Decontamination effectiveness of scabbling
- Activity analysis / assay cost and sampling volume / rate

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

- Concrete - Use VE Proposal for assay methods to optimize analysis of concrete

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

LANL - Develop more detailed design of earthen cover for TA-21, and perform soil testing
LANL - Develop cost effective method for concrete sampling

ESTIMATE WORKSHEET

SHEET 1 of 1

FEATURE: 30-Aug-07 Reuse materials	**PROJECT:** TA-21
Project: TA-21 Material Disposal Area Capping Concepts and Strategies	**DIVISION:**
Case: VST Alt. Proposal No. 8 Formerly Concept E	**UNIT:** TA-21-Closure Team

PLANT ACCT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	ASSUMPTIONS						
		1. Concrete Volume (*1)		13,258	CY		
		2. Concrete yield for cover (*2)		90.00%			
		3. Packaging, transport, disposal (*1)		16.10	cf		
		4. Cost for NTS disposal (FY08) (*2)		0	cf		
		5. Cost for TA-21 surface scabbling (*2)		714,000	LS		
		6. Cost for concerat analysis (*2)		992,000	LS		
		*1 EP2006-0782 pg Table 6.2-1					
		*2 VEVA Study, TA-21 Waste Management, Jun 2007, see consultations					
	ORIGINAL CONCEPT:						
		Bio-intrusion layer cobble material		13,258	CY	20.00	265,160
		Concrete PTD		13,258	cy	434.70	5,763,253
		TOTAL					6,028,413
	VALUE STUDY CONCEPT:						
		Concrete PTD - 10% unable to use		1,326	CY	434.70	576,325
		Bio-intrusion layer layer credit		-1	LS	265,100.00	(265,100)
		Cost for scabbling / rubblizing		1	LS	714,000	714,000
		Cost of concrete analysis		1	LS	992,000	992,000
		TOTAL					**2,017,225**
		NET SAVINGS					4,011,187

QUANTITIES		PRICES	
BY bob anderson	CHECKED	BY bob anderson	CHECKED
DATE PREPARED 08252007	APPROVED	DATE 08252007	PRICE LEVEL

ALTERNATIVE EVALUATION FOR PROPOSAL NO. 9

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Monitoring Program	**FUNCTION:**	Assure Dependability

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 9. ELECTRONIC REMOTE MONITORING
(Formerly Concept H)

Erosion control and near term surveillance for effectiveness is necessary for assurance of the long-term stability of the proposed MDA earthen cover. Digital time-lapse photography should be considered as a new and advantageous surveillance method for continuous monitoring of the external cap condition. This technology would be used as a supplement to existing provisions such as erosion control monuments and erosion pins in order to provide a means for continuing surveillance of the completed earthen cover. Digital photography including both still photos and videos has previously been used by landfill operators as a means of recording landfill operations. This technology could readily be adapted to provide a continuing record the physical status of the earthen cover. The technology could be adapted to record photographic evidence automatically on a periodic basis (for example hourly or daily). The data would be downloaded periodically to a computer for eventual electronic storage. The data would be reviewed periodically (weekly, monthly, quarterly) possibly from a remote location to ensure proper functioning of the equipment and also to verify the status of the cover.

This type of surveillance could be used to provide an immediate visual record of the status of the cover surface such as severe erosion, gullying, etc. following a severe weather incident (heavy rain, high winds, etc.) Also, in the event of a repair to the cover, the effectiveness of the repair or other remedial action could be tracked over several months duration to determine its effectiveness. Another benefit would be visual observation of the condition of the vegetative growth on the cover during extended droughts and also provide visual evidence of the presence and impact on the cover of burrowing animals.

This pictorial database would provide a baseline for a human surveillance inspection, where the inspections could be performed on a less frequent basis due to the existence of the continuing photographic record. The human surveillance would be focused on the areas that the recorded results show as being of greatest significance relative to the cover condition and overall physical status. The photographic records would also provide long-term evidence of the cover status for regulatory bodies and serve as proof of the ongoing surveillance by the responsible party of the cover status and necessary maintenance.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Reduced labor associated with normal detailed "walk-down" surveillance of the entire cover. · • Provides early warning of cap degradation due to severe weather, burrowing animals, dying vegetation. · • Provides continuing evidence of the status of the cover including the effectiveness of repair actions· • Provides evidence to regulatory bodies on the cover status and the ongoing repair/maintenance of the cover· • Provides a long-term history of cap repair and ongoing status.	• Digital electronic status requires periodic checks for equipment maintenance and assurance of proper operations

IDENTIFIED RISKS:

- Possibility of equipment failure requires periodic check. Needed maintenance may lead to gaps in photographic evidence
- Complete 100% coverage of the entire site may not be feasible. Some important areas of the site may experience problems, which are not covered with the digital photographic system.

Note: This proposal is independent of other proposals.

COST COMPARISON FOR PROPOSAL NO. 9

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
Quarterly detailed surveillance audit of cover	Annual surveillance of cover with automated digital photographic system –audited on a bi-weekly basis

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	0	$2,600,000
VALUE CONCEPT (-)	$250,000	$1,800,000
SAVINGS	($250,000)	$800,000
NUMBER OF UNITS (X)	1	1
TOTAL SAVINGS	($250,000)	$800,000
IMPLEMENTATION COSTS(-)		
NET SAVINGS	($250,000)	$800,000

Notes:

Figure 9-1. Proposal 9 – Remote Camera System

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Figure 9-2. Proposal 9 – Pin Monitoring System

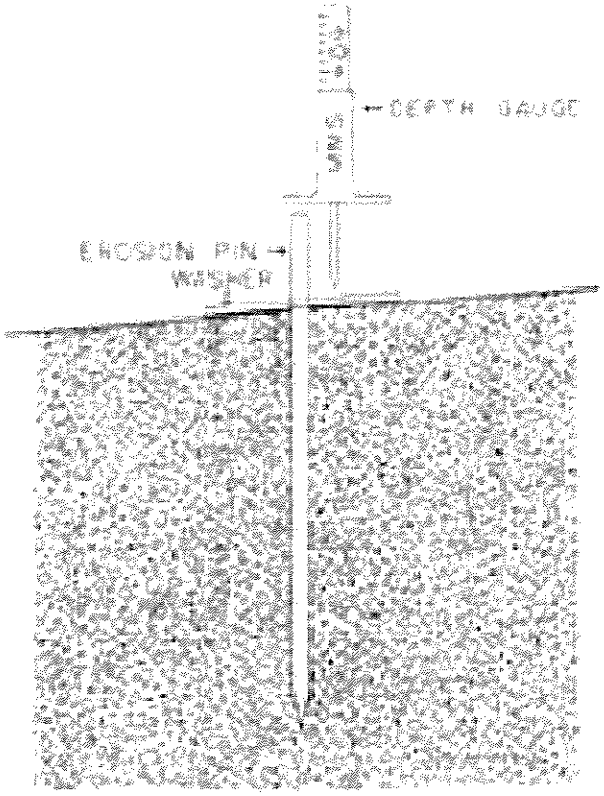

Figure 8.2-6. Typical erosion pin measurement system

Ref: Cover System Design Guide and Requirements Document, April 2007, EP2006-0667

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DESCRIPTION - VALUE STUDY PROPOSAL NO. 9

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:

The active monitoring and maintenance period for disposal site covers is the first 100 years of the 1,000 year design lifetime. During the active maintenance period, ongoing inspections and corrective maintenance of the earthen cover will be performed to provide assurance that following this period the earthen cover will function as designed. The 100-year period is used to provide a reasonable level of confidence that the cover can be left in an unattended mode for the following 900 years with no significant degradation of the cover system. During the 100-year period, it is expected that only limited maintenance will be needed. However, based on past experience with disposal site covers, there have been various instances where significant cover degradation did occur, and these were evidenced shortly after the placement of the cover. Reference 1, LA-UR-06-4715, dated April 2007 provides evidence of the types of problems which could occur, Particular focus in this report are the problems associated with covers for disposal sites situated in arid areas such as those at Los Alamos. Typically the major problems were gullying erosion of the sloped sides, burrowing animal penetrations, and desiccation of the soil leading to vegetation loss. The repair methods for these type of degrading mechanisms are well known, but the effectiveness of the repair to any given cover should be monitored closely since every disposal site will have different environmental and other operating conditions. It is desirable that a continuing record of the type of cover remedial repair be maintained and eventually offered as proof of the effectiveness of the repair. Past experience is that comprehensive data on the ongoing status of this type of maintenance and repair has been lacking. Current digital technology has progressed in recent years where the feasibility of developing a comprehensive photographic record in a cost effective manner is viewed as achievable.

Historically the primary means for visual surveillance of disposal areas has been using erosion monuments (typically located at 4-8 locations of the cover), and detailed periodic walk-downs of the site (possibly performed quarterly or annually for a comprehensive survey) and/or walk downs following a severe weather incident such as a heavy rainstorm. A more recent technique for erosion measurement has been the use of erosion pins (fig.). These pins are comparatively inexpensive and can be placed at a number of locations on the earthen cover exterior. However, since the allowable annual erosion limit for uniform erosion is so small (generally in the range of 0.01 to 0.02 inches annually) it is difficult to obtain an accurate measurement over the short term. It may take as much as 10-20 years to obtain meaningful data trends. In addition to measurement of cover surface physical condition, techniques for subsurface conditions are available and planned for covers for the Los Alamos waste. Moisture content within the ET cover is recorded using reflectometry and lysimeters. These devices, while useful, only provide evidence of the moisture retention within the earthen cover mass—not the actual status of the surface vegetation. However, this data is valuable if vegetation loss is an ongoing problem or there is evidence to postulate that the depth or materials in the ET cover system needs modification. Another techniques for determining cover effectiveness are the use of monitoring wells that penetrate the cover and provide evidence of leachate radioactivity levels—if any. These provide evidence that the cover system is effective while measuring for vertical and possibly lateral transmittal of activity. In summary, the widest reaching means of determining the overall status effectiveness of the earthen cover is periodic detailed inspection of the entire surface of the cover. This type of inspection is visual inspection of the cover surface. This type of inspection should be performed on a scheduled, periodic basis. However, some of the most severe types of cover degradation occur due to severe weather and these incidents occur unpredictably. It is critical that the data on the impact on the cover physical condition due to these events be correlated in real time with the magnitude of the weather conditions and the severity of the cover degradation. This criterion is best met with time-lapse photography.

Digital photography (both still and video) has progressed rapidly in the last decade. The improvements have been in both cost, and optical features related to the sensitivity of the photography. The most important feature of this technology is the ability to automatically integrate the digital data with computers and then to develop a digital record that can be rapidly reviewed. The digital records can be reliably stored in a compact form and be rapidly accessible. The capability of providing a visual record of the entire exterior surface of the earthen cap exists.

DESCRIPTION - VALUE STUDY PROPOSAL NO. 9

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Proposal:
Digital photography (both still and video) has progressed rapidly in the last decade. The improvements have been in both cost, and optical features related to the sensitivity of the photography. The most important feature of this technology is the ability to automatically integrate the digital data with computers and then to develop a digital record that can be rapidly reviewed. The digital records can be reliably stored in a compact form and be rapidly accessible. The capability of providing a visual record of the entire exterior surface of the earthen cap exists.

Assumptions:
An automated digital "time-lapse" photographic system would be designed to provide a continuing record of the exterior of the combined MDA earthen cover to be constructed at TA-21. This system would be combined with the computerized record management system, which documents the status and surveillance performed for the cover. It would serve as an augmentation to the periodic walk-down surveillance, which is required, be performed at the disposal site. It would be included in the computerized record management system for the site and maintained and audited during the 100-year active maintenance period.

The design of the system would include definition of the areas to be covered, the time-lapse photographic frequency, and the inspect ability period of the records and the equipment.

Additional Assumptions:
1. A single detailed annual surveillance inspection plus bi-weekly reviews of the status of the photographic equipment - computer data logger, etc. can be approved as a substitute for detailed more frequent (assumed quarterly) inspections of the facility
2. The digital equipment has an effective operational lifetime of 10 years before obsolescence and increased maintenance conditions prevail. At that time the equipment is upgraded to the current practices and replaced as necessary.

Results:
The economic benefit, as shown previously (an estimated surveillance saving of $800,000 (LCC) over a 100 year period is attributed to reduced number of detailed walk-down surveillance inspections of the earthen cap system. The assumed surveillance inspections would be performed annually versus quarterly. Note that bi-weekly formal checks of the status and effectiveness of the digital data being recorded, as well as the operability condition of the equipment, will still be performed.

The primary benefits of this proposal are not readily quantifiable in economic terms, but are still of critical importance. These benefits accrue to:
(a) The capability of making a more effective assessment of the impact of cover degradation due to severe weather incidents, drought, etc. and the ability to plan and perform more confidently any type of remedial maintenance to the cover
(b) More detailed evidence of the cover stability will be available when the operational period transitions from active to passive maintenance of the cover. If the surveillance reports are positive for an extended period of time, the period of active maintenance may be reduced following inspection of the recorded data.

IMPLEMENTATION OF PROPOSAL NO. 9

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies
CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:
The selection of the photographic equipment and positioning of the equipment on-site so as to obtain the best photographic evidence and the acceptable frequency of picture /video photos being taken
Selection of equipment with acceptable reliability under the operating conditions envisioned
Frequent periodic (assume bi-weekly) audits of the equipment and data rerecording to ensure proper functioning
IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:
Reliability and maintainability of equipment (use solar cells stations for power and periodic checks of equipment functioning properly)
Obsolescence of equipment ---Procure spares for replacement of photographic equipment. Plan on re-evaluation and possible upgrading of equipment on a 10 year cycle
RECOMMENDED PROCEDURES: (WHO DOES WHAT)
Surveillance—performed by the site M&O
Selection of equipment and design—perfect under subcontract to company specializing in integrated photo/computer systems

ESTIMATE WORKSHEET

SHEET 25 _1 OF 25 _

FEATURE: 28-Aug-07
Remote Electronic Monitoring

Project:
TA-21 Material Disposal Area Capping Concepts and Strategies

Case:
VST Alt. Proposal No. 9
Formerly Concept H

PROJECT:
TA-21

DIVISION:

UNIT:
TA-21-Closure Team

PLANT ACCT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		ORIGINAL CONCEPT:					
		Quarterly "walk-down" inspected (single inspection)					
		3 engineers working 9 man days		72	Hrs	90.00	6,480
		Analysis of walk down / data review					
		3 engineers working 12 man days		96	Hrs	90.00	8,640
		Report - writing, audit, review					
		3 eng/QA working 15 man days		120	Hrs	90.00	10,800
		SUBTOTAL:					**25,920**
		Four (4) Annual Walk Downs		4	Ea	25,920.00	103,680
		100 year lifetime COST		100	Yrs	103,680.00	**10,368,000**
		PROPOSED CONCEPT:					
		Equipment Cost		1	Ea	250,000.00	**250,000**
		*10 year lifetime amortized 25,000 / yr		100	yr	25,000.00	2,500,000
		Bi-weekly audit					
		Engineering - 4 hrs Inspection 26 times/yr at $90/hr		104	hrs	90.00	9,360
		QA Audit - 4 times a year 8hrs/audit *4/yr at $90/hr		32	hrs	90.00	2,880
		subtotal					12,240
		Annual walk down		288	hrs	90.00	25,920
		LABOR SUBTOTAL PER YEAR:					**38,160**
		TOTAL ANNUAL					**63,160**
		OVER 100 YEARS		100	yr	38,160.00	3,816,000
		TOTAL OVER 100 YEARS					**6,316,000**
		raw savings					4,052,000

QUANTITIES		PRICES	
BY bob anderson	CHECKED	BY bob anderson	CHECKED
DATE PREPARED 08/28/2007	APPROVED	DATE 08/28/2007	PRICE LEVEL

VALUE STUDY - LIFE CYCLE COST ANALYSIS

USING PRESENT WORTH (PW) COSTS

Date: 08/29/2007

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies
COMPONENT: inspection system
Discount Rate: 3.2%
Economic Life: 50

			ORIGINAL PLAN		PROPOSAL 9		ALTERNATIVE 2		ALTERNATIVE 3	
			Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth
ATERAL COSTS										
A. *Original concept*			$0	$0		$0		$0		$0
B. *VE Concept with camera and maint records*				$0	$250,000	$250,000		$0		$0
C.				$0		$0		$0		$0
D.				$0		$0		$0		$0
E.				$0		$0		$0		$0
F.				$0		$0		$0		$0
G.				$0		$0		$0		$0
Total initial/Collateral Costs				$0		$250,000		$0		$0
REPLACEMENT/SALVAGE (Single Expenditures)	Year	PW Factor								
A.		0.0000		$0		$0		$0		$0
B.		0.0000		$0		$0		$0		$0
C.		0.0000		$0		$0		$0		$0
D.		0.0000		$0		$0		$0		$0
E.		0.0000		$0		$0		$0		$0
F.		0.0000		$0		$0		$0		$0
G.		0.0000		$0		$0		$0		$0
H.		0.0000		$0		$0		$0		$0
I.		0.0000		$0		$0		$0		$0
J.		0.0000		$0		$0		$0		$0
K.		0.0000		$0		$0		$0		$0
Total Replacement/Salvage Costs				$0		$0		$0		$0
ANNUAL COSTS	Escal. Rate	PWA Factor w/escal.								
A. *Original*		24.781	$103,680	$2,569,251		$0		$0		$0
B. *VE Concept*		24.781		$0	$63,160	$1,565,142		$0		$0
C.		0.000		$0		$0		$0		$0
D.		0.000		$0		$0		$0		$0
E.		0.000		$0		$0		$0		$0
F.		0.000		$0		$0		$0		$0
Total Annual Costs				$2,569,251		$1,565,142		$0		$0
TOTAL PRESENT WORTH COSTS				$2,569,251		$1,815,142		$0		$0
LIFE CYCLE (PW) SAVINGS						$754,109		$0		$0

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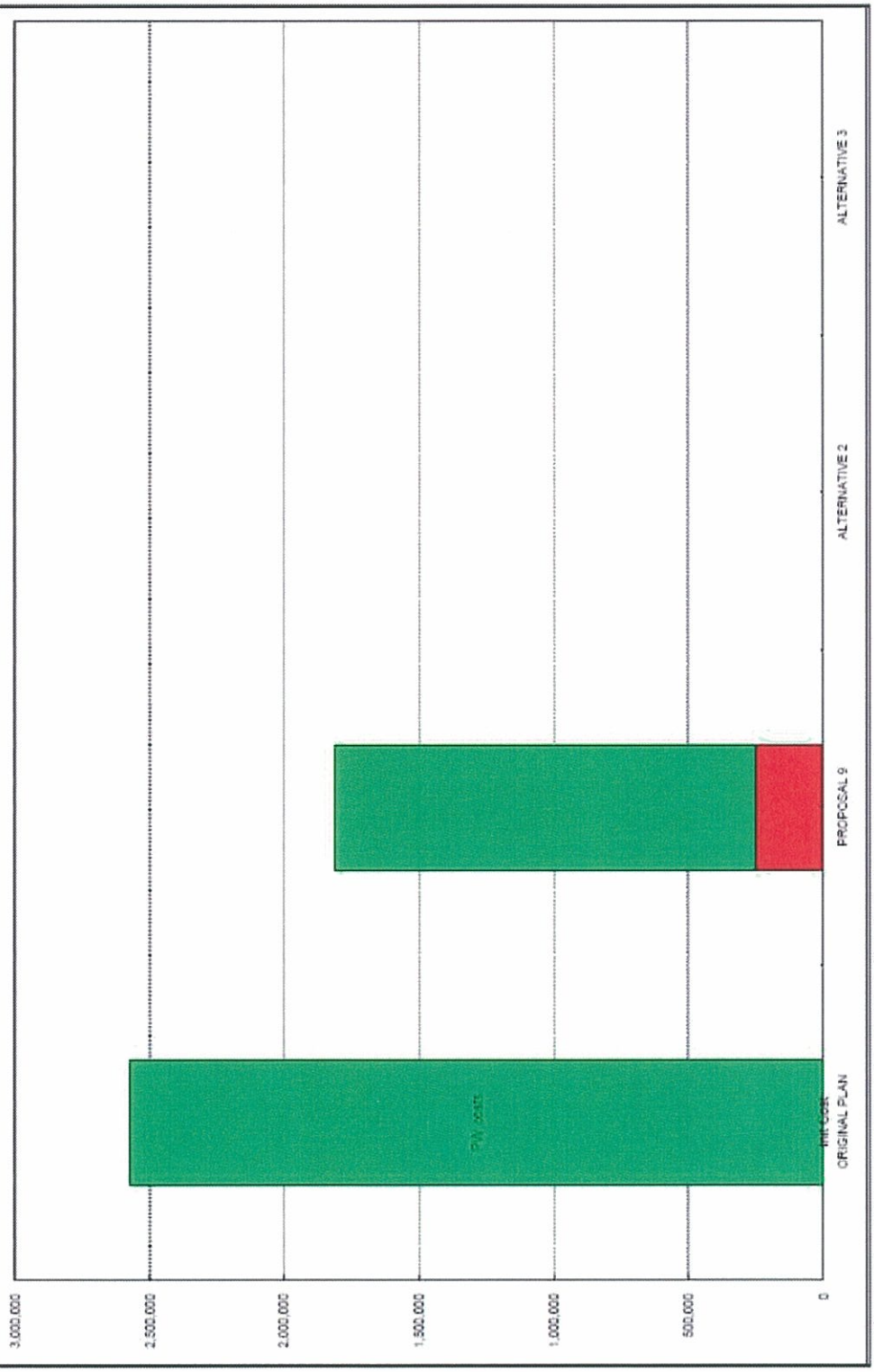
VALUE STUDY - LIFE CYCLE COST ANALYSIS - GRAPH

USING PRESENT WORTH (PW) COSTS

ACTIVITY: TA-21 Material Disposal Area Capping Concepts and Strategies DISCOUNT RATE: 3.2%

Date: 09/26/2007
ECONOMIC LIFE: 50 YEARS



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ALTERNATIVE EVALUATION FOR PROPOSAL NO. 10

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	TA-21 Closure	**FUNCTION:**	enhance performance, reduce costs

ALTERNATIVE DESCRIPTION

PROPOSAL NO. 10 INTEGRATE TA-21 COVER SYSTEM AND D&D ACTIVITIES
(Formerly Concept R)

The D&D of the facilities at TA-21 and installing a cover system on MDA-A and MDA-T are being conducted as separate projects. This proposal is to review the D&D and closure projects to understand where close coordination of activities will improve efficiency of implementation. Coordinating implementation of several smaller projects provides a means to show early progress to NMED by tackling the overall work in discrete phases that show visible progress (i.e., facility demolition) earlier than might otherwise be the case.

In doing this, opportunities for activities that will result in cost savings presented in other proposals should be evaluated and included when feasible.

This approach will likely require revisions of some consent order milestones.

ADVANTAGES / BENEFITS	DISADVANTAGES
Examples of integration of D&D and cover system include: • Sequencing removal of buildings from atop SWMUs in a progression that allows their remediation and cover systems to be coordinated with MDA-A & MDA-T cover systems. • If MDA-A and MDA-T are designed with individual cover systems, flexibility is provided for budget management. • The opportunity to use D&D concrete waste material as a biological barrier layer, avoiding expensive disposal of the material. • The opportunity to place some D&D building waste beneath the cover system in the area between MDA-A and MDA-T, avoiding expensive disposal of some LLW.	• Smaller sub-projects may result in greater life cycle cost if level-of-effort project support is not managed efficiently. • Can create a perception of a delaying tactic for final closure of MDA-A & MDA-T.

IDENTIFIED RISKS:

- Regulatory limits on the duration of interim storage of above ground D&D waste may require it to be shipped if placement of the cover system is delayed
- Frequent reprogramming of government funds for D&D poses a greater potential for upsetting progress of projects with many closely coupled activities in comparison with several small projects spread over many years.

Note: This proposal is independent of other proposals. However, some of the other proposals are represented by the advantages above.

COST COMPARISON FOR PROPOSAL NO. 10

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
- See notes below	- See notes below

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT		
VALUE CONCEPT (-)		
SAVINGS	see note	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	see note	
IMPLEMENTATION COSTS(-)		
NET SAVINGS	see note	

Notes:

It would be highly speculative to quantify potential savings. However, coordinating the D&D and cover systems projects can result in avoided costs from the following factors:

1) Avoiding NMED fines by showing early visible progress

2) Minimizing potential for interference with the installation of the cover system when other work is taking place on the DP mesa

3) Avoidance of interruption with the installation of the cover system to wait for demolition of interfering structures

4) Reuse of demolished concrete for the cover system biological barrier and potential for disposing some demolished superstructure materials avoids their transport and disposal costs.

VEVA STUDY TEAM MDA-A, T ESTIMATE SPREADSHEET

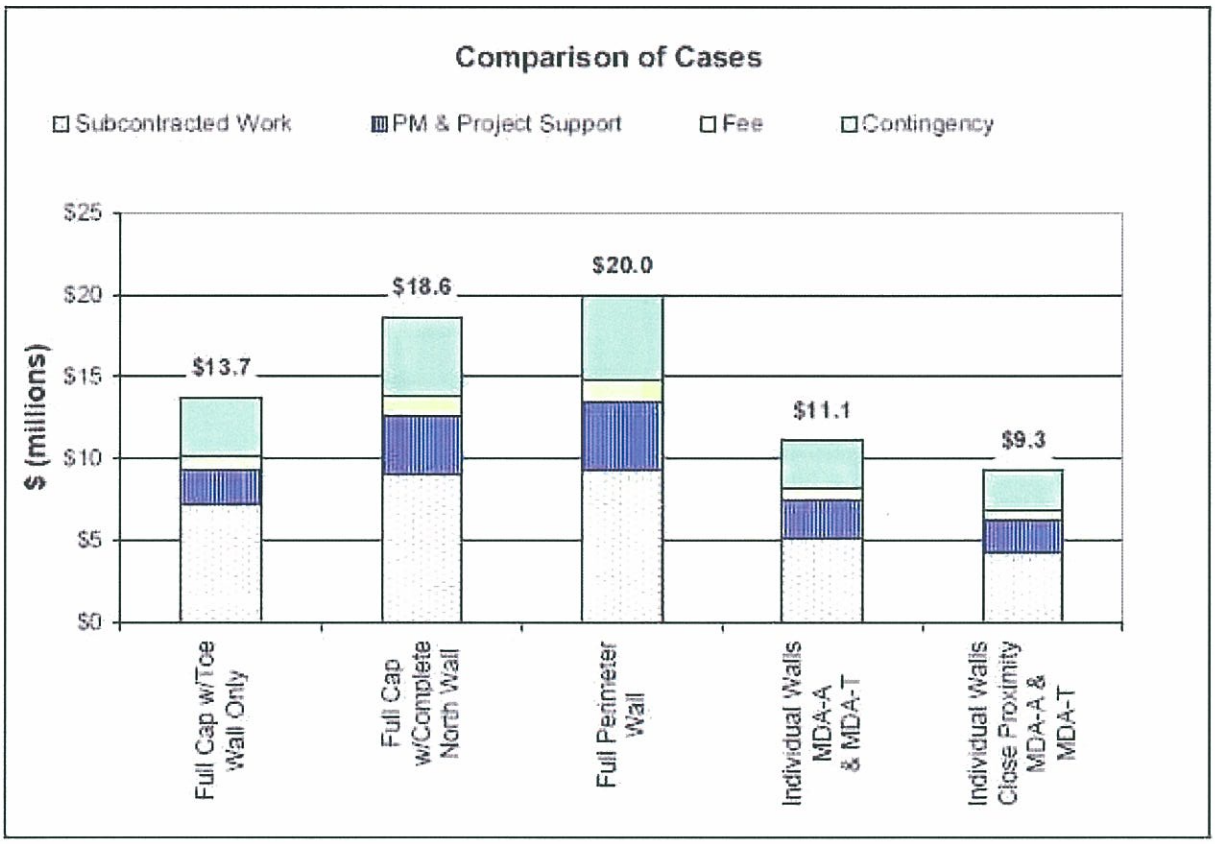
TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Summaries

VE Proposal Number	1			3	4
Excel Case Reference #	1	2	3	4 plus 5	6 plus 7
	Full Cap w/Toe Wall Only	Full Cap w/Complete North Wall	Full Perimeter Wall	Individual Walls MDA-A & MDA-T	Individual Walls Close Proximity MDA-A & MDA-T
Prime Contractor LOE					
Project duration (months)	15	26	31	17	15
PM & Project Support	$1,795,200	$3,111,680	$3,650,240	$2,034,560	$1,795,200
G&A 13%	$233,376	$404,518	$474,531	$264,493	$233,376
PM & Project Support	$2,028,576	$3,516,198	$4,124,771	$2,299,053	$2,028,576
Subcontracted Work					
Training	$15,840	$15,840	$15,840	$15,840	$15,840
Site Preparation & Regrading	$399,820	$399,820	$399,820	$100,916	$92,677
Place Cover Materials	$3,117,151	$2,617,141	$1,998,631	$1,184,442	$643,128
Revegetation	$272,860	$272,860	$272,860	$86,335	$56,225
Retention Wall	$869,000	$3,000,000	$3,869,500	$1,535,000	$1,309,500
Security Fence	$136,800	$136,800	$136,800	$94,720	$80,800
Common Subcontracted Work	$1,547,900	$1,547,900	$1,547,900	$1,547,900	$1,547,900
Subtotal	$6,379,381	$7,990,381	$8,241,371	$4,565,153	$3,736,270
Subcontract Markup before Fee 13%	$829,321	$1,038,750	$1,071,378	$593,470	$485,715
Subcontracted Work	$7,208,712	$9,029,131	$9,312,749	$5,158,623	$4,221,986
Prime & Subcontract	$9,237,288	$12,545,329	$13,437,520	$7,457,676	$6,250,562
Fee 10%	$923,729	$1,254,533	$1,343,752	$745,768	$625,056
Subtotal	$10,161,017	$13,799,862	$14,781,272	$8,203,443	$6,875,618
Contingency 35%	$3,556,356	$4,829,952	$5,173,445	$2,871,205	$2,406,456
Overall Totals	$13,717,372	$18,629,813	$19,954,718	$11,074,648	$9,282,084

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Summaries



TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Costs Common to All Cases

Project Management & Project Support Level of Effort (LOE)		#	Hourly Rate	Cost per Month	Hours/month
Project Management & Project Controls	PM	1	$120.00	$21,120	176
	Project Controls	1	$65.00	$11,440	
	Admin Asst	1	$45.00	$7,920	
			Subtotal	**$40,480**	
Project Support (Engineering, QA, etc.)	PE	1	$90.00	$15,840	
	Engineer	1	$90.00	$15,840	
	Inspectors	2	$65.00	$22,880	
			Subtotal	**$54,560**	
Readiness, Health, and Safety	Supervisor	1	$75.00	$13,200	
	Inspectors	1	$65.00	$11,440	
			Subtotal	**$24,640**	
			Total Monthly Cost	**$119,680**	

Common Subcontracted Work				
Install Time Domain Reflectrometry			$235,100	From Racer escalated by 6%
Allowance for consumables			$200,000	Allowance
Monitoring Wells Installation			$594,000	Rich Dabolt ROM estimate
Demolish Existing Slab		$170 per cy	$12,800	4069 sf from racer x 6" = 75.4 cy
Remove sludge from General's tanks			$476,000	From June VE Study
	Total Common Subcontracted Costs		**$1,547,900**	

Other Site Preparation Costs (applied on a case-by-case basis)		
Remove North Road	$21,000	See note below
Relocate Utilities	$200,000	Allowance

Road Demolition: R.S. Means Heavy Construction Cost Data for 2006 gives a demolition cost for 3" thick asphalt as $4.11/yd^2. I escalated this by 3% to $4.23/yd^2. Demolishing the road at 1330 ft by 34 ft comes to $20,773. I suggest we use $21,000 for this.

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #							
Case Title				Full Cap w/Toe Wall Only			
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,840	3	$660	24	hour	
Site Preparation and Regrading		$399,820					
Grubbing	3		7	$124	56	hour	$6,931
Grading	6		135	$124	1,080	hour	$133,672
Surveying	2		9	$151	72	hour	$10,858
Utilities Isolation & Relocation	allowance						$200,000
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$21,000
Place Cover Materials		$3,117,151					
Cost of Silty Loam	100			$20	132,016	cy	$2,640,314
Cost of Bio Barrier	104			$30	11,022	cy	$330,669
Placement of Materials	6		48	$124	384	hour	$47,528
Placement of Materials Equipment	121		48	$2,055	48	day	$98,640
Revegetation		$272,880					
Seed	105			$5	54,000	sy	$270,000
Labor	7		4	$90	32	hour	$2,880
Retention Wall		$889,000					
All inclusive cost	101			$500	1,778	cy	$889,000
Security Fence		$136,800					
All inclusive cost	103			$40	3,420	lf	$136,800
Total		$4,831,491					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #	2						
Case Title	Full Cap w/Complete North Wall						
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,040	3	$660	24	hour	
Site Preparation and Regrading		$399,820					
Grubbing	3		7	$124	56	hour	$6,931
Grading	6		135	$124	1,080	hour	$133,672
Surveying	2		9	$151	72	hour	$10,868
Utilities Isolation & Relocation	allowance						$200,000
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$21,000
Place Cover Materials		$2,617,141					
Cost of Silty Loam	100			$20	107,015	cy	$2,140,304
Cost of Bio Barrier	104			$30	11,022	cy	$330,669
Placement of Materials	6		48	$124	384	hour	$47,528
Placement of Materials Equipment	121		48	$2,055	48	day	$98,640
Revegetation		$272,880					
Seed	105			$5	54,000	sy	$270,000
Labor	7		4	$90	32	hour	$2,880
Retention Wall		$3,000,000					
All inclusive cost	101			$500	6,000	cy	$3,000,000
Security Fence		$136,800					
All inclusive cost	103			$40	3,420	lf	$136,800
Total		$6,442,481					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #	3						
Case Title	Full Perimeter Wall						
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,840	3	$660	24	hour	
Site Preparation and Regrading		$399,820					
Grubbing	3		7	$124	56	hour	$6,931
Grading	6		135	$124	1,080	hour	$133,672
Surveying	2		9	$151	72	hour	$10,858
Utilities Isolation & Relocation	allowance						$200,000
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$21,000
Place Cover Materials		$1,998,631					
Cost of Silty Loam	100			$20	76,090	cy	$1,521,794
Cost of Bio Barrier	104			$30	11,022	cy	$330,669
Placement of Materials	6		48	$124	384	hour	$47,528
Placement of Materials Equipment	121		48	$2,055	48	day	$98,640
Revegetation		$272,880					
Seed	105			$5	54,000	sy	$270,000
Labor	7		4	$90	32	hour	$2,880
Retention Wall		$3,869,500					
All inclusive cost	101			$500	7,739	cy	$3,869,500
Security Fence		$136,800					
All inclusive cost	103			$40	3,420	lf	$136,800
Total		$6,693,471					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #	4						
Case Title	Individual Wall MDA-A						
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,840	3	$660	24	hour	
Site Preparation and Regrading		$55,517					
Grubbing	3		1	$124	8	hour	$990
Grading	6		25	$124	200	hour	$24,764
Surveying	2		2	$151	16	hour	$2,413
Utilities Isolation & Relocation	allowance						$0
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$0
Place Cover Materials		$765,739					
Cost of Silty Loam	100			$20	0	cy	$0
Cost of Bio Barrier	104			$20	24,611	cy	$738,333
Placement of Materials	6		9	$124	72	hour	$8,911
Placement of Materials Equipment	121		9	$2,055	9	day	$18,495
Revegetation		$51,880					
Seed	105			$5	9,800	sy	$49,000
Labor	7		4	$90	32	hour	$2,880
Retention Wall		$862,000					
All inclusive cost	101			$500	1,724	cy	$862,000
Security Fence		$53,200					
All inclusive cost	103			$40	1,330	lf	$53,200
Total		$1,804,176					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #	5						
Case Title	Individual Wall MDA-T						
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,840	3	$660	24	hour	
Site Preparation and Regrading		$45,399					
Grubbing	3		1	$124	8	hour	$990
Grading	6		16	$124	128	hour	$15,843
Surveying	2		1	$151	8	hour	$1,208
Utilities Isolation & Relocation	allowance						$0
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$0
Place Cover Materials		$418,702					
Cost of Silty Loam	100			$20	16,228	cy	$324,557
Cost of Bio Barrier	104			$30	2,529	cy	$75,875
Placement of Materials	6		6	$124	48	hour	$5,941
Placement of Materials Equipment	121		6	$2,055	6	day	$12,330
Revegetation		$34,455					
Seed	105			$5	6,315	sy	$31,575
Labor	7		4	$80	32	hour	$2,880
Retention Wall		$673,000					
All inclusive cost	101			$500	1,346	cy	$673,000
Security Fence		$41,520					
All inclusive cost	103			$40	1,038	lf	$41,520
Total		$1,228,917					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #	6						
Case Title	Individual Wall Close Proximity MDA-A						
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,840	3	$660	24	hour	
Site Preparation and Regrading		$45,399					
Grubbing	3		1	$124	8	hour	$990
Grading	6		16	$124	128	hour	$15,843
Surveying	2		1	$151	8	hour	$1,208
Utilities Isolation & Relocation	allowance		0				$0
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$0
Place Cover Materials		$408,438					
Cost of Silty Loam	100			$20	15,673	cy	$313,465
Cost of Bio Barrier	104			$30	2,557	cy	$76,703
Placement of Materials	6		6	$124	48	hour	$5,941
Placement of Materials Equipment	121		6	$2,055	6	day	$12,330
Revegetation		$34,800					
Seed	105			$5	6,384	sy	$31,920
Labor	7		4	$90	32	hour	$2,880
Retention Wall		$732,500					
All inclusive cost	101			$500	1,465	cy	$732,500
Security Fence		$45,200					
All inclusive cost	103			$40	1,130	lf	$45,200
Total		$1,282,178					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Case Variable Subcontract Work

Case Reference #	7						
Case Title	Individual Wall Close Proximity MDA-T						
Case Elements	Resource type	Cost	Crew Days	Rate	Quantity	Unit	Individual Elements
Training	1	$15,840	3	$880	24	hour	
Site Preparation and Regrading		$37,478					
Grubbing	3		0	$124	0	hour	$0
Grading	6		9	$124	72	hour	$8,911
Surveying	2		1	$151	8	hour	$1,208
Utilities Isolation & Relocation	allowance		0				$0
Remove existing fence	123			$8	3,420	lf	$27,360
Remove north road	allowance						$0
Place Cover Materials		$234,690					
Cost of Silty Loam	100			$20	9,050	cy	$180,991
Cost of Bio Barrier	104			$30	1,485	cy	$44,564
Placement of Materials	6		3	$124	24	hour	$2,970
Placement of Materials Equipment	121		3	$2,055	3	day	$6,165
Revegetation		$21,425					
Seed	105			$5	3,709	sy	$18,545
Labor	7		4	590	32	hour	$2,880
Retention Wall		$577,000					
All inclusive cost	101			$500	1,154	cy	$577,000
Security Fence		$35,600					
All inclusive cost	103			$40	890	lf	$35,600
Total		$922,033					

TA-21 MDA-A MDA-T Cover System Project Cost Estimate

Quantities and Productivity

	units	1 Full Cap w/Toe Wall Only	2 Full Cap w/Complete North Wall	3 Full Perimeter Wall	4 Individual Wall MDA-A	5 Individual Wall MDA-T	6 Individual Wall Close Proximity MDA-A	7 Individual Wall Close Proximity MDA-T
Cover System Area	sy	54,000	54,000	54,000	8,800	6,315	6,364	3,700
Fill Volumes								
Waste Cap	cy	68,148	68,148	68,148	26,188	16,881	17,045	9,900
Center Section	cy	5,334	5,334	5,334	0	0	0	0
Skirt	cy	48,518	27,222	0	0	0	0	0
Mound	cy	13,030	13,030	13,030	2,370	1,876	1,185	632
Skirt Corners	cy	7,407	3,704	0	0	0	0	0
	Sum	143,038	118,038	87,112	28,538	18,757	18,230	10,535
Types of Fill								
Silty Loam		132,016	107,016	76,090	24,611	16,228	16,673	9,050
Bio Barrier, Bottom of Cap & Center Section	15%	11,022	11,022	11,022	3,928	2,529	2,557	1,485
Wall Volume	cy	1,778	6,000	7,729	1,724	1,366	1,465	1,154
Security Fence	lf	3,420	3,420	3,420	1,030	1,030	1,130	860

Schedule Requirements (Crew days)	1 Full Cap w/Toe Wall Only	2 Full Cap w/Complete North Wall	3 Full Perimeter Wall	4 Individual Wall MDA-A	5 Individual Wall MDA-T	6 Individual Wall Close Proximity MDA-A	7 Individual Wall Close Proximity MDA-T	Rate per crew day	Units
Surveying	9	9	9	2	1	1	1	1.25	acres
Grubbing	7	7	7	1	1	1	0	1.60	acres
Compacting	48	48	48	9	6	6	3	1,125	sq yd
Grading	135	135	135	25	16	16	9	400	sq yd
Seeding	9	9	9	2	1	1	1	52,000	sq ft
Concrete Pour	198	667	360	192	150	163	126	9	cy
Sum	400	875	1,068	231	175	188	142		
Months	16	40	40	11	8	9	6		
Assume 2 crews	9	20	25	11	8	9	6		
Eqpt, Std. & Evaluate (see note below)	6	6	6	6	6	6	6		
Schedule w/engineering & solicitation	15	26	31	17	14	15	12		
				Conduct in Parallel		Conduct in Parallel			

4,840 sq yd/acre

Note: The 6 months for engineering and procurement reflects an assumption that more engineering and procurement personnel during this period offset the greater number of S&H and inspection personnel during the field work.

Labor Code	Crew Name	Crew Rate per hours
1	Training	$[illegible]
2	Surveying	$[illegible]
3	Clearing	$[illegible]
4	Forming	$[illegible]
5	Pouring	$[illegible]
6	Site Prep	$[illegible]
7	Revegetation	$[illegible]

Type	Labor Rate	Per Hour
1	First Aid	$[illegible]
2	First Aid	$[illegible]
3	Equip Mgr	$[illegible]
4	Office Mgr	$[illegible]
5	Foreman	$[illegible]
6	Laborer	$[illegible]
7	Admin Asst	$[illegible]
8	Engineer	$[illegible]
9	Drafting	$[illegible]
10	Engineer	$[illegible]
11	Eq Operator	$[illegible]
12	Inspector	$[illegible]
13	Mechanic	$[illegible]
14	Electrician	$[illegible]
15	Driver	$[illegible]
16	Average Rate	$[illegible]
17	RF Supr	$[illegible]
18	QC Tech	$[illegible]
19	Foreman	$[illegible]
20	Carpenter	$[illegible]
21	Survey Crew Chief	$[illegible]
22	Instrumentman	$[illegible]
23	-	

Labor Code	Crew Activity	Crew Size	Labor Type	Crew	Rate
1	Training	1	2	First Aid	[illegible]
		[illegible]	16	Average Rate	[illegible]
		[illegible]	23	-	
		[illegible]	22		
		[illegible]	23	-	
2	Surveying	2	21	Survey Crew Chief	[illegible]
		1	22	Instrumentman	[illegible]
		2	6	Laborer	[illegible]
		[illegible]	23		
		[illegible]	23	-	
3	Clearing Grubbing Haul Debris	1	11	Eq Operator	[illegible]
		[illegible]	6	Laborer	[illegible]
		[illegible]	23	-	
		[illegible]	23	-	
		[illegible]	22	-	
4	Forming Placing and Finishing Items	1	19	Foreman	[illegible]
		4	16	Carpenter	[illegible]
		1	6	Laborer	[illegible]
		[illegible]	23	-	
		[illegible]	23		
5	Pouring Hand Cast engine stands and curative tests	1	19	Foreman	[illegible]
		1	20	Carpenter	[illegible]
		3	6	Laborer	[illegible]
		1	11	Eq Operator	[illegible]
			23	-	
6	Site Prep Establishing staging Haul Stores and Utilities	1	11	Eq Operator	[illegible]
		1	6	Laborer	[illegible]
			23		
			23		
			22		
7	Revegetation Planting & seeding Hand Mulch	[illegible]	11	Eq Operator	[illegible]
			23		
			23	-	
			23		
			23		

Labor	Unit	Equipment	Unit Rate
[illegible]	cy	24% Lime	[illegible]
[illegible]	cy	Well Water	[illegible]
[illegible]	hr	Grading & Grading	[illegible]
[illegible]	E	Fence installation	[illegible]
[illegible]	cy	Site Paver	[illegible]
[illegible]	cy	Seed	[illegible]
[illegible]	day	Hydroseeder	[illegible]
[illegible]	day	Front end Loader	[illegible]
[illegible]	day	Forklift	[illegible]
[illegible]	day	Dump Truck	[illegible]
[illegible]	day	8 Cement Trucks	[illegible]
[illegible]	job	Rock Crusher	[illegible]
[illegible]	day	8 Cement Trucks	[illegible]
[illegible]	hr	Pumps	[illegible]
[illegible]	ft	Polar Cat*	[illegible]
[illegible]	hr	Misc Supplies	[illegible]
[illegible]	day	Crawler	[illegible]
[illegible]	day	Pulse	[illegible]
[illegible]	day	Dozer	[illegible]
[illegible]	day	Backhoe	[illegible]
[illegible]	day	Shovels	[illegible]
[illegible]	day	Equipment Operator*	[illegible]
[illegible]	day	Concrete Pump	[illegible]
[illegible]	F	Remove existing fence	[illegible]

* Equipment Cost is the sum of the items above

Item				
Front end loader (1.5 Yard/cycle)	6	$ [illegible]	$ [illegible]	
Forklift	6	$ [illegible]	$ [illegible]	
Dump truck (12 Yard/cycle)	8	$ [illegible]	$ [illegible]	
8 Cement trucks (Hyd Mixers)	[illegible]	$ [illegible]	$ [illegible]	
Rock crusher	1	$ [illegible]	$ [illegible]	
8 Cement trucks (Hyd Mixers)	[illegible]	$ [illegible]	$ [illegible]	
Compressors	1	$ [illegible]	$ [illegible]	
Polar Cat* (1,440,000 at 2.00%)	1	$ [illegible]	$ [illegible]	
Miscellaneous supplies	1	$ [illegible]	$ [illegible]	
Crawler (Eq/day)		$ [illegible]		
Pulse (Eq/day)		$ [illegible]		
Dozer (Eq/day)		$ [illegible]		
Backhoe (Eq/day)		$ [illegible]		
Shovels (Eq/day)		$ [illegible]		
Concrete Pump (Eq/day)		$ [illegible]		

VEVA STUDY TEAM MDA-A, T ESTIMATE SPREADSHEET DESCRIPTION

Purpose:

The VE session for evaluating alternate designs for a cover system for MDA-A and MDA-T includes several cost estimates of total project cost (TPC) using a spreadsheet as a tool. The baseline TPC estimate and 4 alternatives are contained in one spreadsheet. The purpose here is to describe the estimate calculations.

Descriptions of the baseline case and alternatives are contained in other VE session documents and thus are not repeated here.

Key cost estimating assumptions are:

- All field work is conducted by subcontractors
- Project management and project support are estimated as level-of-effort (LOE) activities that include 6 months work prior to initiation of field work for purposes of engineering, specification, bid, and evaluation. The overall schedule duration is based on productivity rates applied to the volumes of material to be placed and areas to be treated. This duration was also used for estimating the LOE project management and project support costs during the fieldwork.
- Subcontractor training is 3 days for all workers.
- The estimates are conceptual. They have been conducted with a combination of applying parametric unit costs, some allowances, a couple of elements from the RACER results, and multipliers, which are:
  - G&A: 13%
  - Markup of subcontracted costs: 13%
  - Prime contract fee: 10%
  - Contingency: 35%; because of the conceptual nature of the estimate
- Data from R.S. Means Heavy Construction Cost Data for 2006 was used for most of the unit costs, with adjustment by the team for differences between generic commercial and Los Alamos work. Others were obtained by web searches or from the experience of the team.
- Unit lengths (e.g., for fencing), areas (e.g., for re-vegetation), and volumes (e.g., for cover system and barrier construction) were scaled from contour maps of the area.

Cases: The estimate cases are numbered and labeled as follows:

Case No.	Case Label
1	Full Cap w/Toe Wall Only
2	Full Cap w/Complete North Wall
3	Full Perimeter Wall
4	Individual Wall MDA-A
5	Individual Wall MDA-T
6	Individual Wall Close Proximity MDA-A
7	Individual Wall Close Proximity MDA-T
4 plus 5	Individual Walls MDA-A & MDA-T
6 plus 7	Individual Walls Close Proximity MDA-A & MDA-T

Five cases address project costs for MDA-A and MDA-T, shaded in the above list; that is, the first 3 and the last two.

Spreadsheet Worksheets:

The spreadsheet consists of 5 worksheets with labels and contents as follows:

- Summary – is a rolled up results of the cost elements for the cases listed above. The cost elements are on other worksheets listed below. The total costs are also presented graphically on this worksheet. Note that the columns with cases 4 through 7 may be hidden for presentation purposes. Calculations on this worksheet in addition to the rollup include:
  - Adding the results of cases 4 with 5, and 6 with 7, to arrive at the TPC for each of the individual wall alternatives
  - Applying G&A, subcontractor markup, fee, and contingency
  - Level of effort project management and project support costs by applying a monthly cost (from the common cost worksheet) to the schedule duration approximation (from the Quantities and Productivity worksheet).
- Common Costs – this worksheet addresses two types of costs common to all alternatives. A monthly estimate of project management and project support costs is derived for level-of-effort estimate. This work is assumed to be conducted by the site prime contractors. The second group is subcontracted fieldwork and allowances, which is assumed to not very among the alternatives.
- Cases – this worksheet is where Cases 1 through 7 are estimated. Most of the entries on this worksheet are formula lookups from the next two worksheets. However there are a few manual entries for crew-days assumptions or where a formula entry is set to zero because of the nature of the alternative.
- Quantities & Productivity – this worksheet is where quantities are entered from calculations elsewhere for cover system areas and volumes, wall volumes, and fence lengths for lookup from the Cases worksheet. In addition, to arrive at an approximation of a project schedule, productivity factors are used to derive major activity durations (in months) assuming two crews are working the project. The overall schedule estimates are used for calculating the level-of-effort costs on the Summary worksheet.
- Ref – this worksheet contains all the labor and equipment unit rates for lookup within the other worksheets.

ADDITIONAL/OTHER CONCEPTS FOR FURTHER CONSIDERATION

(A LISTING OF ITEMS WITH POTENTIAL FOR COST OR OTHER VALUE IMPROVEMENT)

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

DESCRIPTION	ESTIMATE OF DOLLARS INVOLVED	REMARKS
Construct Cap With Material From East End Of DP Mesa Material appears similar to that from borrow area and the existing top and toe has much material that could be harvested with minimal vertical change in elevation.	$250,000 and traffic impact on town	**Advantages** • Reduce traffic impact on Trinity Rd. • Reduce transportation cost **Disadvantages** • Requires additional permitting and EA or EIS. • Material may need to be amended to make it acceptable as cap material. • Increased ecological impact. **Risks** • This may reduce habitat for the spotted owl • Time and trouble for EIS/EA change may not be acceptable to client
L Concrete toe at cap. Reinforcement at toe with concrete in lieu of rock	undetermined	**Advantages:** Accurate schedule, reduces material for cover **Disadvantages:** None identified. **Risks:** None identified

VALUE STUDY ELEMENTS CONSIDERED AS POTENTIAL PROPOSALS AND THEIR DISPOSITION

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CONCEPT/IDEA SOURCE/INITIAL PADD	DISPOSITION
A Place demolition debris between A & T Place demolition debris in open spaces (lag storage) between caps A & T. When connecting A&T and smoothing curves - certain open spaces can be used for lag storage prior to using cap as cover. **Advantages:** Efficient use of space in TA-21 for cover, integrating D&D area - cleanup of TA-21 with caps being constructed, considerable material will be available, 2 -4000 cy for disposal, shows progress to NMED **Disadvantages:** Schedule disruptions may occur between capping and D&D due to funding **Risks:** Funding not available on timely basis, approval for temp lag storage is not obtained.	Quadrant 2, Priority 1, presented as Proposal 7. Initial champions: Bob, Chuck
B Transplant vegetation, material reuse integration with D&D Find means to replant/reseed/transplant suitable (shallow rooted) local vegetation on cap - rather than seeding using new seed material **Advantages:** Vegetation has base of growth in TA-21 area, vegetative shallow rooted plants have grown directly over absorption area in MDA A&T **Disadvantages:** Not a scientifically proven seed/soil mixture, possible difficulty and cost in transplanting, transplanting cost may be more than automated seeding **Risk:** Transplanting may be impractical for certain plants	Quadrant 6, no action taken.
C Local borrowed soil Qualify borrow soil on TA-21 area. Current plans are to transport from TA-61, which involves heavy truck movement through town. Use material from east end of DP mesa for construction of cap. **Advantages:** Less traffic in Los Alamos, reduced cost **Disadvantages:** Additional permitting requirements may be prohibitive, material may need to amended to be useful as cap material, increased ecological impacts	Quadrant 4, Priority 2, presented as Other Concepts For Further Consideration. Initial champions: Rich, Bob
D Optimize cap shape (same as M) Optimization of cap dimensions: slopes, depths, smooth continuous curves, simplify distances. Combined MDA A&T cap: maximize open areas for new additional waste. Baseline MDA-T&A one cover. Demolish buildings at MDA-T east end; place rubble in smooth extension of MDA T. Optimize perimeter shape to maximize disposal space for D&D debris. Develop cap dimensions to effectively and safely capture maximum amount of waste at reasonable cost. Smooth out dimensions of MDA A&T into single cap with proper dimensions in key north slope area. **Advantages:** Making continuous cap adds extra volume. Optimal height/slopes provided to minimize erosion and preclude north slope infringement. Certain areas (gap between A&T) can be used for lag storage. Minimize quantity of fill needed for cap. Provides baseline for future LANL cap designs. **Disadvantages:** Largest footprint	Quadrant 4, Priority 1, presented as Proposal 1. Initial champions: Chuck, Rich

VALUE STUDY ELEMENTS CONSIDERED AS POTENTIAL PROPOSALS AND THEIR DISPOSITION

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CONCEPT/IDEA SOURCE/INITIAL PADD	DISPOSITION
E Reuse and effective use of D&D material Concrete rubble can be used for bio-intrusion barrier. Some metal can be added to areas of cap for disposal. Use of concrete rubble for bio-barrier: optimize depth size and include use of capillary break. Try to integrate some of metal waste for disposal in MDA - A/T caps. Advantages: This is similar/identical to recommendation presented in prior VE/VA June study	Quadrant 4, Priority 2, presented as Proposal 8. Initial champions: Bob, Rich
F Integrate retaining wall and cap design (same as N)	Same as Concept N
G Caisson approach to capping no barrier (same as P)	Same as Concept P
H Remote electronic monitoring surveillance and maintenance Ease of repair for wall versus cover. Use of digital camera and video camera to take video and photos plus height markers records cap on a continuing basis automatically to have record of cap status over time. **Advantages:** Provides record for both status of cap/cover and possible damage due to rain/snow, loss of vegetation. Provides time data on impact of rain/heat on vegetation and slope stability . Provides evidence of effectiveness of repair and revegetation. Provides record to regulator of actual maintenance performed and timelines. **Disadvantages:** Cost of implementation, bi-monthly checking /storing of records required **Risks:** Failure of automated camera, failure to keep records up to date.	Quadrant 2, Priority 1, presented as Proposal 9. Initial champions: Bob, Rich
I Contamination control, contamination on north face of mesa This must be accomplished and the transport of contamination eliminated before the cap can be installed over MDA- A and MDA-T. **Advantages:** Provide opportunity to stop spread of contamination, ensure that contamination will not migrate out from under cap. **Disadvantages:** Possible schedule delay, increased cost. **Risk:** Any associated risk will come from not performing this task.	Quadrant 1, Priority 1. Initial champions: Rich, Bob Determine source and transport mechanism for The LANL Project Leader is confident that the contamination is from past surface transport and operating practices rather than from migration from the buried waste. Therefore this concept is being removed from consideration.
J Horizontal monitoring of wells Use horizontal bore holes from north face of mesa as monitoring wells. Holes would be bored below the bottom of the waste. **Advantages:** Improved opportunity for detecting contaminate migration. Fewer wells required. **Disadvantages:** Non-conventional. More difficult to access.	Quadrant 2, Priority 1, presented as Proposal 6. Initial champions:

VALUE STUDY ELEMENTS CONSIDERED AS POTENTIAL PROPOSALS AND THEIR DISPOSITION

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CONCEPT/IDEA SOURCE/INITIAL PADD	DISPOSITION
K Concrete toe at cap Reinforcement at toe with concrete in lieu of rock **Advantages:** Accurate schedule, reduces material for cover **Disadvantages:** None identified.	Quadrant 3; Other Concepts For Further Consideration
L Full Cap No Retention Barrier / or With Concrete Toe **Advantages:** Time to build **Disadvantages:** Large footprint	Quadrant 4, Priority 1, presented as Proposal 1. Initial champions: Chuck, Rich
M Full Cap North Retention Barrier Only **Advantages:** Improved erosion resistance on north face **Disadvantages:** Time to build	Quadrant 5, Priority 2, later rejected as was found to be too costly. Initial champions: Mick, Rich
N Full Periphery Retention Barrier, Integrate Retaining Wall in Cap Design Construct wall entirely surrounding MDA-A and MDA-T as a single unit. Consider 360-degree retaining wall. (also F) **Advantages:** Reduce amount of fill required, permits north perimeter road to remain open, minimizes potential for erosion, avoid disturbing north side of canyon scope. **Disadvantages:** Not conventional approach, possible increased potential for lateral intrusion of water	Quadrant 4, Priority 2, later rejected as was found to be too costly. Initial champions: Mick, Rich
O Full Periphery Retention Barrier Reduced Footprint Including/Excluding 2 East Pits **Advantages:** Only requires 10' high wall, less D&D disposal, smallest footprint	Quadrant 5, Priority 2, presented as Proposal 2. Initial champions: Mick, Rich
P Individual MDA with Full Retention Barrier Including/Excluding 2 East Pits (also G) **Advantages:** Cost, smallest footprint **Disadvantages:** Non-conventional	Quadrant 4, Priority 1, presented as Proposal 3. Initial champions: Mick, Chuck
Q Integration of cap with total TA-21 schedule Revise consent order to reflect a WBS developed from Technical optimum. Use concrete wall along the north wall side - use as alternate for armoring rock - needed for steeper slope. Capping / D&D activities to impact / negate NMED fines. NMED is potentially fining LANL for lack of progress on clean up of TA-21 and is part of this problem. There is a need to show some progress. Several of the cap/cover and tie-in together MDA A&T cap systems along with some smaller D&D effort can be used to show near term progress. **Advantages:** LANL can show earlier progress with smaller funding, identification of smaller D&D efforts that can be placed and included with initiation of capping show progress. **Disadvantages:** Progress may not reflect minimal life cycle cost by performing smaller jobs **Risks:** Disagreement at LANL funding for D&D serves to 'kill' this type of effort, DOE/LANL problems with early D&D of TA-21 and lag storage.	Quadrant 7, Priority 2, presented as Proposal 10. Initial champions: Chuck, Bob

VALUE STUDY ELEMENTS CONSIDERED AS POTENTIAL PROPOSALS AND THEIR DISPOSITION

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CONCEPT/IDEA SOURCE/INITIAL PADD	DISPOSITION
R **Concave cap**: Added concept Friday	Added concept day 3, presented as Proposal 4. Initial champion: Rich
S **Enhanced retaining wall:** Added concept Friday	Added concept day 3, presented as Proposal 5. Initial champion: Rich

CONSULTATION RECORD

CONSULTANT/CONTACT INFO (Name, Title, Company, Address, Phone, e-mail)	MAIN TOPIC DISCUSSED AND INFORMATION RECEIVED
American Concrete Institute ACI 318 Design of concrete structures	Design reference
ASTM C1372-04e2 Standard Specification for Dry-Cast Segmental Retaining Wall Units	Design reference
2002 Design Manual for Segmental retaining Walls, National Concrete Masonry Association Large Retaining Wall Tests Terzaghi, K.	Design reference
SDG 3 Structures Design Guidelines FDOT	Design reference
FHWA-NHI-00-043 Mechanical Stabilized Earth Walls and Reinforced Soil Slope Designs	Design reference
Telecon of 8/24/07 and 8/27/07 with Sargent & Lundy Engineers, Chicago, IL on codes, standards and concrete longevity. (Accepted onto LANL ASL 8/27/07)	Design reference
Technical Area 21 Site Closure Activities Traffic Management Plan LA-UR-07-0574 Feb 2007 EP2007-0024	General background
Technical Area 21 Site Closure Activities Waste Management Plan LA-US-07-0929 Feb 2007 EP2006-0782	General background
Cover System Design Guidance and Requirements Document LA-UR-06-4715 April 2007 EP2006-0667	General background
MOTA Corporation: SAMI VE LLC Value Analysis TA-21 Waste Disposal Options Subject Materials	General background
Nuclear Waste Department of Energy's Pit 9 Cleanup Project is Experiencing Problems GAO/T-RCED-97-221 July 28, 1997	General background
US DOE Order 460.1B Packaging and Transportation Safety	General background
US Department of Energy O 413.3 Program and project management for the acquisition of capital assets	General background
New Regulations for Transporting Radioactive Material Liam Sullivan Hazardous Materials Professional Office of Radiation, Chemical, & Biological Safety Michigan State University	General background
Traffic Impact Analysis for DP Road Developments in Los Alamos County NM Wilson & CO, November 2005	General background
Appendix K Evaluation of Human Health Effects from Transportation	General background
Appendix H Impacts Analyses of Closure and Remediation Actions	General background
NUREG 1575, Supplement 1, Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME), Draft for comment, EPA 402-R-06-002, DOE-EH-707, December 2006	General background
NUREG 1575, Multi Agency Radiation Survey and Site Investigation Manual (MARSSIM), Rev. 1, August 2000. EPA 402-R-97-016.	General background
U.S. Environmental Protection Agency, 2000. Guidance for the Data Quality Objectives Process (EPA QA/G-4). EPA/600/R-96/055. Office of Research and Development.	General background
U.S. Environmental Protection Agency, 2002. Choosing a Sampling Design for Environmental Data Collection (EPA QA/G-5S). EPA/240/R-02/005. Office of	General background

CONSULTATION RECORD

CONSULTANT/CONTACT INFO (Name, Title, Company, Address, Phone, e-mail)	MAIN TOPIC DISCUSSED AND INFORMATION RECEIVED
Environmental Information.	
U.S. Environmental Protection Agency, 2004. Data Quality Assessment: A Reviewer's Guide (Final Draft) (EPA QA/G-9R). EPA/240/B-06/002. Office of Environmental Information.	General background
U.S. Environmental Protection Agency, 2004. Data Quality Assessment: A Reviewer's Guide (Final Draft) (EPA QA/G-9R). EPA/240/B-06/002. Office of Environmental Information.	General background
U.S. Environmental Protection Agency, 2000. Guidance for Data Quality Assessment, Practical Methods for Data Analysis (EPA QA/G-9). EPA/600/R-96/084. Office of Research and Development.	General background
Gilbert, R.O., 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley, New York, NY.	General background
American National Standards Institute, ANSI N13.12, January 2000, Surface and Volumetric Radioactivity Guides for Materials, Equipment and Facilities to Be Released for Uncontrolled Use.	General background

PREVIOUS VE STUDY INFORMATION/DATA DOCUMENTS CONSULTED

DOCUMENT (Name, Author, Dates, etc.)	INFORMATION RECEIVED/USED
Attachment A, Specifications and Requirements for Task Order 1 Statement of Work, Decontamination, Decommissioning, and Demolition of TA-21 DP West, Jan 2007 Draft	General background
DD&D FFP Bid Quantities Table Spreadsheet	General background
Discussion of TA-21 DD&D Program Incentives Plan, Task Order 1 – DP West, June 2006 Draft	General background
TA-21 DP West DD&D Incentives Plan, Task Order 1 – DP West, Dec 2006 Draft	General background
Table 5 - Positive Incentives Recovery Matrix, Jan 2007 Draft	General background
A12 39553 Bid Worksheets and Instructions, Jan 2007 Draft	General background
Statement of Work for Task Order 1, Decontamination, Decommissioning, and Demolition of TA-21 DP West, Nov 2006 Draft	General background
Statement of Work for Task Order 1, Decontamination, Decommissioning, and Demolition of TA-21 DP West, Jan 2007 Draft	General background
TA-21 Task Order 1 - Statement of Work Pricing Schedule, 44662-RFP-06 F3, Jan 2007 Draft	General background

PREVIOUS VE STUDY INFORMATION/DATA DOCUMENTS CONSULTED

DOCUMENT (Name, Author, Dates, etc.)	INFORMATION RECEIVED/USED
TA-21 Task Order 1 - Statement of Work Pricing Schedule, 44662-RFP-06 F3, Jan 2007 Draft	General background
Bid Specifications and Requirements for Task Order 1, Decontamination, Decommissioning, and Demolition of TA-21 DP West, June 2006 Draft	General background
Attachment 1, LANL Radionuclide Screening Action Levels (SALs), Jan 2007 Draft	General background
Bid Specifications and Requirements for Task Order 1, Decontamination, Decommissioning, and Demolition of TA-21 DP West, June 2006 Draft	General background
Value Engineering Study Mission Statement for TA-21 Decontamination and Decommissioning Project, Task Order 1	VEVA event mission guide
VEVA analysis graphs and worksheets	Pareto and other VEVA models used to identify potential area with high value opportunities, team workshop guide documents

Additional documents available at Nuclear Watch "An INDEX to the LANL SWEIS Reference Documents, v.1.3" http://www.nukewatch.org/SWEIS/Index.htm

GLOSSARY OF PERTINENT STANDARD VALUE METHOD TERMS

Annual Costs. The annual expenditure of funds or other resources to ensure the product's satisfactory continued functioning during its economic life.

Alternative Analysis Matrix. A process using the results of the criteria weighting to determine the apparent relative rank for various identified alternatives.

Alternative Value Increment Comparison. A comparison procedure used to evaluate the comparative incremental worth versus its incremental cost for a series of alternatives that meet the identified essential needs relatively equally.

Benefits, Disadvantages, and Risk Analysis. An assessment identifying the benefits, disadvantages, and possible associated risks related to pursuing a particular alternative to its final conclusion.

Basic Function. The main function(s) that meets the essential needs of the process, procedure, or activity that the product must achieve.

Certified Value Specialist. A person who has been certified to have all the qualifications to conduct, monitor, guide, and instruct people in the practice of the Value Method process from SAVE International.

Component. An identified portion of the process, procedure, or activity under study. These may be a physical feature or "mission" type features such as the stated purposes for the activity.

Cost Model. An illustrative diagram that shows the relationship of expenditures as they relate to the functions and components.

Criteria Weighting. A procedure applied to the governing criteria to determine the relative weight of specific criteria as it relates to the other criteria.

Criteria/Limits Analysis. An evaluation of the criteria and limits that govern the process, procedure, or activity; the cost and worth of them in time, money, or other measurement scales; and the flexibility for changing them (hard=not possible to economically change, soft=may be possible to economically change).

Final Report. Value study report with editorial, and other modifications done with respect to the feedback received during presentations, made to the Presentation Report basic results.

Functional Analysis. A process using a two-word definition of the purpose or affect of a particular component. To promote understanding and facilitate value study activities, functions are limited to an active verb and measurable noun.

Function-Logic-Diagram. A diagram of the functions that lays out the purposes behind each function and its interrelationship with other functions. The most common type of diagram is the Functional Analysis System Technique (FAST).

Higher-Order Function. The function(s) that the entire product must achieve to meet the ultimate purpose for the process, procedure, or activity.

Implementation. The suggested process identified by the value study as an appropriate means to implement a specific value study proposal.

Involved Parties. The owners, users, and stakeholders that have a concern in the Program, Project, or Activity, or its final outcome product.

Life-Cycle Costs. The true economic cost of an alternative stated in present worth terms that uses a specified time value of money and economic life and includes all cost (non-recurring, recurring, annual, and any potential salvage capacity).

Non-Recurring Costs. The initial outlay of funds or other resources to obtain the product.

Presentation Report. Value study report used for presenting the results of the value study activity. The end result commodity for a process, procedure, or activity.

Proposal. An alternative means identified within the confines of the value study to achieve the purpose for the product that satisfactorily meets the specified criteria and limits.

Recurring Costs. The periodic expenditure of funds or other resources to ensure the product will satisfactory continue to function during its economic life.

Job Plan. The activity plan that is used in every value study.

GLOSSARY OF PERTINENT STANDARD VALUE METHOD TERMS

Value. The worth of a product to the involved parties as it is related to its cost (monetary and non-monetary).

Value Added. A feature that does not increase the value of the product monetarily, but increases the worth of the product to the involved parties.

Value Analysis. The Value Methodology process as it is usually applied to an activity for a process, procedure, or repetitive activity.

Value Engineering. The Value Methodology process as it is typically applied to an engineering type application. Often conducted during the 25 to 40 percent design (concept phase) and consists of a completely independent team.

Value Method. An organized, systematic effort directed at analyzing functions for the purpose of achieving the essential functions at the lowest life-cycle cost.

Value Mismatch. An observed disparity identified in the function-logic-diagram, or other procedures, between the apparent worth of the function and its cost.

Value Study. An investigation of a specified process, problem, procedure, activity, or product using the Value Methodology process for the purpose of ensuring and/or improving the value of the final product for involved parties.

GLOSSARY OF OTHER TERMS AND ACRONYMS

Full list available at:

http://www.lanl.gov/tools/acronyms/AML.html

GLOSSARY OF OTHER TERMS AND ACRONYMS

Full list available at: web.em.doe.gov/acronyms_frame.html

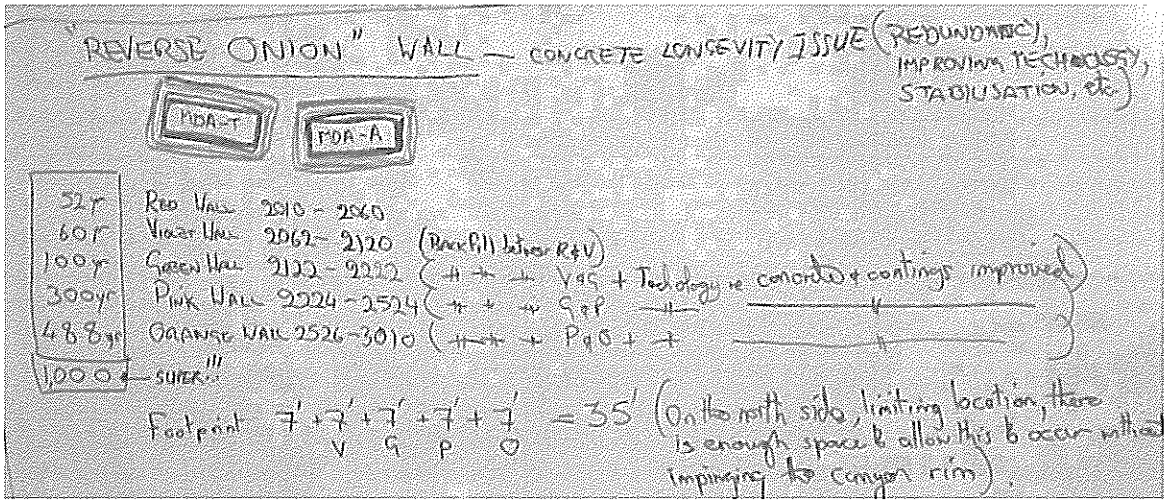
AL. Albuquerque
ACM. Asbestos-Containing Materials
ASAP. Adaptive Sampling and Analysis Program
BMP. Best Management Practices
CEMP. Columbus Environmental Management Project (located in Columbus Ohio)
COC. Containment of concern
COE. United States Department of the Army, Corps of Engineers
CFR. Code of Federal Regulations
CWDR. Chemical Waste Disposal Request
D&D. Decommissioning and decontamination
DD&D. Decontamination, decommissioning, and demolition
DOD. Department of Defense
DOE. United States Department of Energy
DOE-NM. United States Department of Energy, New Mexico Field Office
DP. Delta Prime
DZB. Demolition zone boundary
ENV-ECR. Environmental Stewardship–Environmental Characterization and Remediation
ERSS. Environment & Remediation Support Services
EPA. Environmental Protection Agency
ER. Environmental Restoration
FEMP. Fernald Environmental Management Project (located in Fernald Ohio)
FFP. Firm Fixed Price
FUSRAP. Formerly Utilized Sites (RAP unknown)
FSS. Final Survey Sample

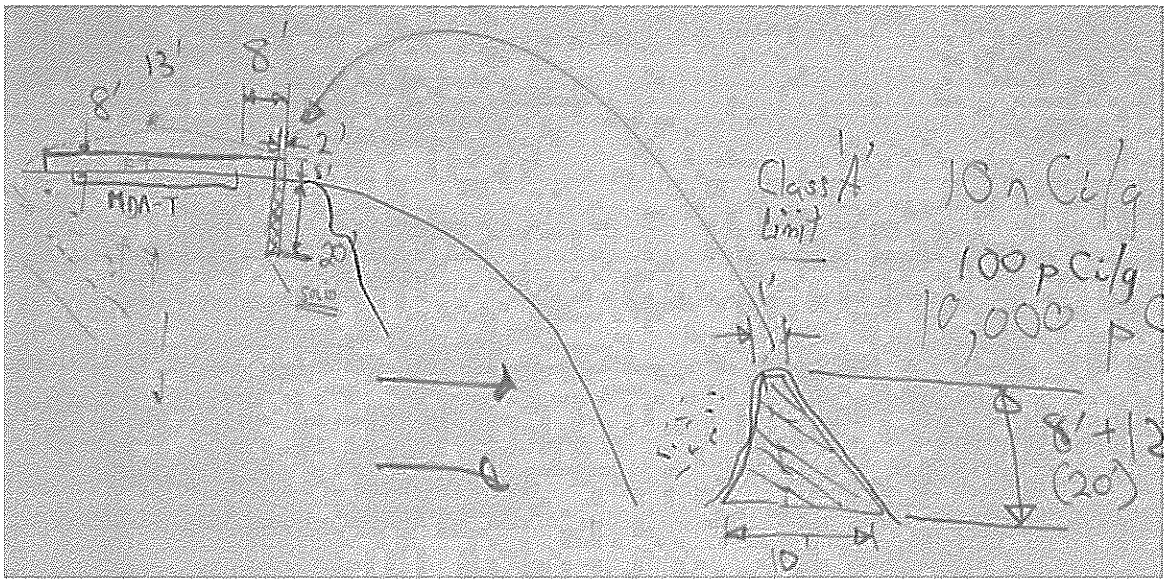
GLOSSARY OF OTHER TERMS AND ACRONYMS

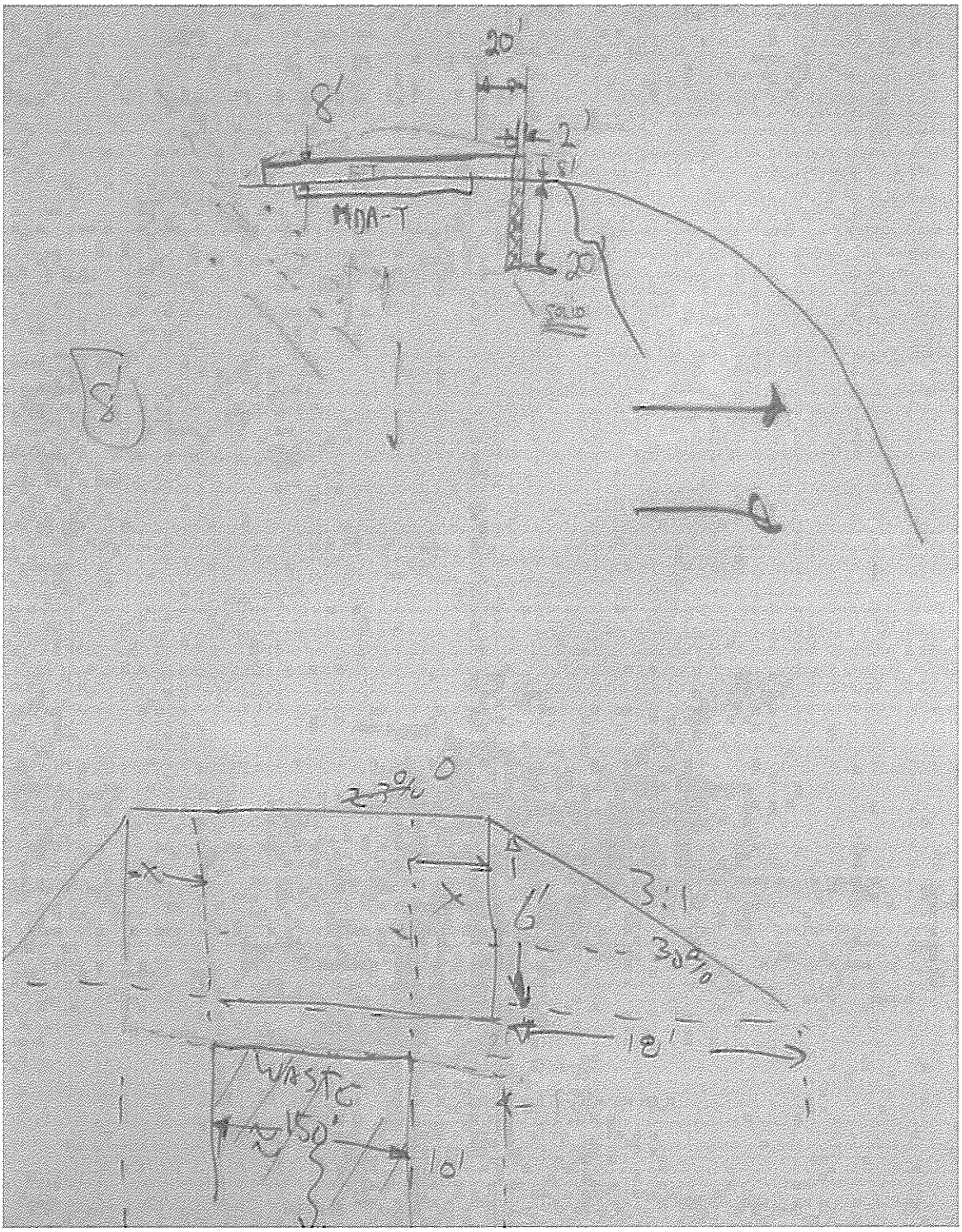
FTE. Full-time equivalent, a combination of hours equaling 2080 in a given year is equivalent to one person working all year.
FY. Fiscal year
GFI. Ground fault interrupter
HEPA. High efficiency particulate air (filter implied)
HPGe. High Purity Germanium
HW. Hazardous waste
IH&P 4.12.7/4.13.4
IMP. Integrated Management Plan
IWD. Integrated Work Document
INEEL. Idaho National Environmental Engineering Lab
ITRD. Innovative Treatment Remediation Demonstration
IVC. Independent Verification Certification
IWD. Integrated Word Document
KSL. Kellogg Brown & Root, Inc. Government Operations-Shaw Environmental & Infrastructure, Inc-Los Alamos Technical Associates, Inc partnership that provides infrastructure and engineering support to LANL http://kslonline.com/
LANL. Los Alamos National Laboratory
LCAM. Department of Energy's Life Cycle Asset Management program
LIG. Laboratory Implementation Guide
LIR. Laboratory Implementation Requirements
LLW. Low Level Waste
MAQ Group. Maximum Anticipated Quantities
MARSSIM. Multi-agency Radiation Survey and Site Investigation Manual
MDA. Material Disposal Area
MLLW. Mixed hazardous low-level radioactive waste
MOADS. Molecular Optical Air Data System
MOAD. duplicate acronym Mother of All Databases - *suggest it be spelled out in documents*
NM. New Mexico
NMED. New Mexico Environment Department
NMSW. New Mexico Special Waste
NPDES. National Pollutant Discharge Elimination System
NRC. Nuclear Regulatory Commission
NTEP. National Type Evaluation Program
NTP. Notice To Proceed
NUREG. Nuclear Regulations
NY. New York
OH. Ohio (if by itself, usually the State of Ohio, if combined with another identifier, the office in Ohio for that identifier.)
OST. Office of Science and Technology
P2. Pollution Prevention PID. Proportional Indicator Detector
PCB. Polychlorinated Biphenyls
PDS. 6.1.1.1, power distribution system -recommend against use as there are many PDS acronyms
PDT. Process Definitive Testing
PSAR. Preliminary Safety Analysis Report
PR-ID. Permit and Requirements Information System
PU-U-TH. Plutonium-Uranium-Thorium

GLOSSARY OF OTHER TERMS AND ACRONYMS

QA. Quality assurance
QAPD. Quality Assurance Program Description
QAPP. Quality Assurance Program Plan
QAR. Quality Assurance Record
QAR. Quality Assurance Representative
QARMS. QA Records Management System
QASC. Quality Assurance Support Contractor
QV. Quality verification
RAL. Radioanalytical Laboratory
RCA. Radiological control areas
RCRA. Resource Conservations and Recovery Act
RFP. Request for Proposal
RMI. Reactive Materials Incorporated
RP-1. Radiological Protection Division, Health Physics Operations Group
RP-2. Radiological Protection Division, Health Physics Measurements Group
RP-3. Radiological Protection Division, Radiation Protection Technical Support Group.6
RPF. Records Processing Facility
RPP. Radiological Protection Program
S&M. Surveillance and Maintenance
SAL. Screening Action Levels
SGS. Segmented Gate System
SME. subject matter expert or Society for Manufacturing Engineers
SMO. Sample Management Office
SNL. Sandia National Laboratories
SSC. Structure Systems and Components
SSHASP. Site-Specific Health And Safety Plan
SSL. Soil Screening Levels
SOW. Statement of work
SWPPP. Storm Water Pollution Prevention Plan
TA. Technical Area
TEDE. Total Effective Dose Equivalent
TLD. Thermoluminescent Dosimetry/Dosimeter
TRU. Transuranic waste
TSCA. Toxic Substances Control Act
TSD. Technical Support Document
VRC. Volumetric Release Criteria
WAC. Waste Acceptance Criteria
W/Min. Waste minimization
WCS. Work Control Schedule, or
WCS. Waste Control Specialist
WMP. Waste Management Plan
WPF. Waste Preparation Facility


"REVERSE ONION" WALL — CONCRETE LONGEVITY ISSUE (REDUNDANCY, IMPROVING TECHNOLOGY, STABILISATION, etc.)
MDA-T
MDA-A
32 yr
60 yr
100 yr
300 yr
488 yr
1000 yr
Red Wall 2010 - 2060
Violet Wall 2062 - 2120 (Back fill behind R&V)
Green Wall 2122 - 2222 (" " " V95 + Technology re concrete + coatings improved)
Pink Wall 2224 - 2524 (" " " S98 " " ")
Orange Wall 2526 - 3010 (" " " P90 " " ")
SUPER!!!
Footprint 7' + 7' + 7' + 7' + 7' = 35' (On the north side, limiting location, there is enough space to allow this to occur without impinging to canyon rim).
V S P O


13'
8'
8'
2'
MDA-T
SOLID
Class A Limit
10 n Ci/g
100 p Ci/g
10,000 p
8' + 12
(20')
10'


20'
8'
2'
MOA-T
20'
Gate
Q
2-3%
3:1
6'
3:1
18'
W/A STC
150'
10'

ALTERNATIVE EVALUATION FOR CONCEPT N

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cap	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

CONCEPT N. FULL CAP WITH NORTH RETAINING WALL ONLY
(Formerly Concept N)

This proposal investigates the cost range for a single engineered cover over both the MDA-T and MDA-A waste regions. To reduce the need for a gradual declination of the north side of the single cap due to the sharp fall off in that region this proposal considers the inclusion of a north retaining wall of appropriate height to provide appropriate erosion mitigation of the cap for the 1,000 year life.

The cap will extend to slightly over the current perimeters of the two waste regions with the exception of joining the two waste regions together at the eastern most point of MDA-T and the western most point of MDA-A. The cap will be approximately 1,100 ft x 300 ft. All materials used in the cap are to be obtained locally and assumed to be suitable.

The north retaining wall will traverse the north perimeter of MDA-T and MDA-A and will be approximately 1,100 ft in length, 1 ft and 12 ft thick at the top and bottom respectively and have a height of 20 ft. These retention wall blocks are of significant size due to location adjacent to the northern access road and the steep drop off at that location. The wall will be built to appropriate ACI/ASTM/DoE standards to support longevity with the application of appropriate surveillance and timely repair. ACI 318 is the controlling document. (Reinforced concrete cracks due to aging, settlement, and corrosive environs and one cannot really prevent this. That is why concrete is reinforced and the steel resists the tensile and flexural loads). Note that the retention wall does not have the function of preventing the migration of contamination its function is purely to prevent the erosion of the cap material.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Project early start early due to preparation ahead of cap. • Project can be interrupted should budget constraints occur. • TA-21 D&D materials may be placed behind the wall. • Retention wall is easily accessible for inspection purposes. • Wall can be easily and economically repaired. • North area of the cap footprint reduced.	• South side of the cap requires extensive increase in footprint to provide erosion control (3:1) • Additional fill volume will be required to adjoin the MDAs. • Anchoring of the north wall will be required to mitigate 'slip' as the wall is not contiguous. • 1,000-year longevity justification. • Use of natural rock to build an adjacent or future wall. • Concrete and/or coatings technology – slow progress.

IDENTIFIED RISKS:

Materials cannot be obtained and/or formed locally. Concrete technology does not allow justifiable extended concrete life.

Note: This proposal is mutually exclusive with other proposals.

COST COMPARISON FOR CONCEPT N

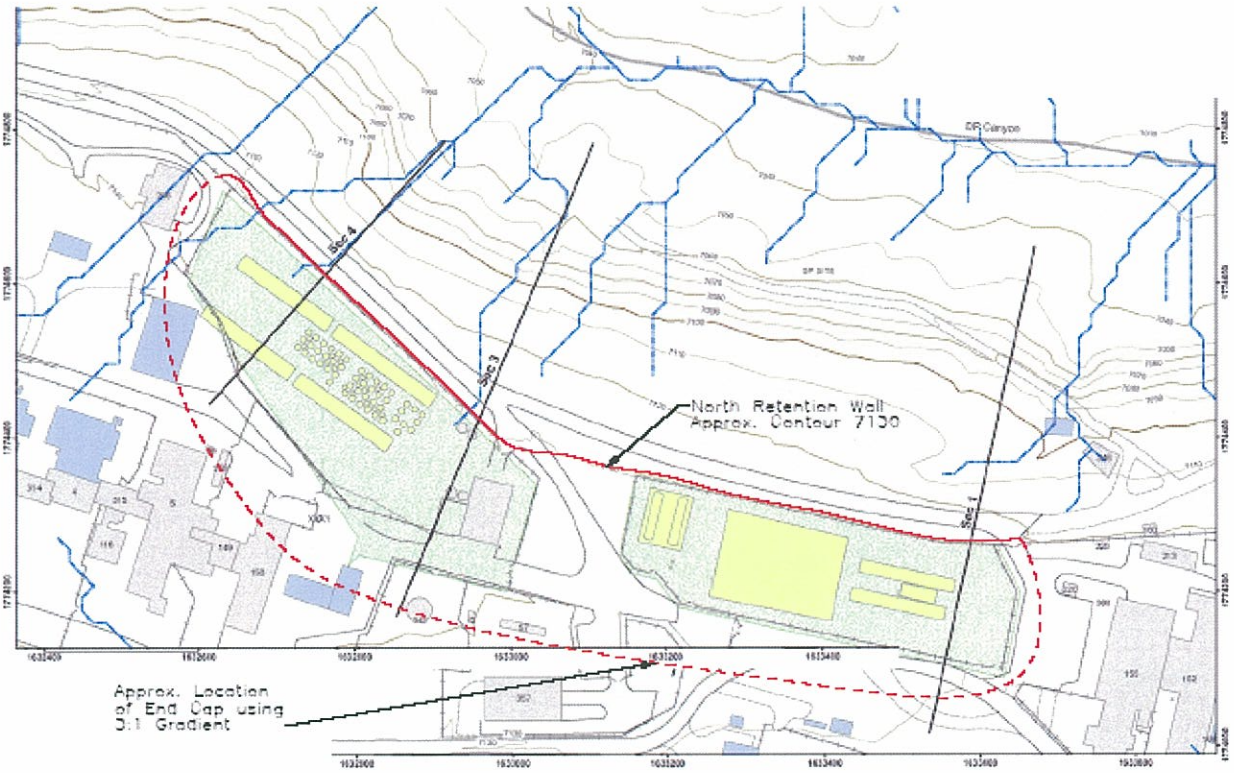
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
$13.7M	$18.6M

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	$13.7M	
VALUE CONCEPT (-)	$18.6M	
SAVINGS	($4.9M)	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	($4.9M)	
IMPLEMENTATION COSTS(-)	$18.6M	
NET SAVINGS	($4.9M)	

Notes:

Figure N-1. Concept N– Full Cap with Complete North Wall



FPAG.VER

DESCRIPTION- VALUE STUDY CONCEPT N

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:

This VE study has proposed the use of a bare reinforced full or partial concrete retaining wall(s) around the cap of the MDAs.

Proposal:

Use an engineered reinforced concrete wall in place of a skirt in the north region of MDA-A and MDA-T for the full perimeter length to negate the need for fill in the area of the canyon.

Assumptions:

There is abundant documentation available to predict a minimum life expectancy of 500 years for the concrete wall. The regulatory guidance specifies a 100-year active surveillance and maintenance period and then 900 years of passive containment. This proposal assumes that the concrete will meet that requirement. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

IMPLEMENTATION OF CONCEPT N

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

The physical configuration of the wall and the chemical composition of the cement must be carefully engineered.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

This proposal assumes that the concrete will meet the requirement for a 1000-year life. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

It is imperative to note that cracks in the concrete will not result in its failure to meet its design function.

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

LANL should contract the services of people or entities with extensive knowledge of the design and chemistry of concrete systems to take the lead on this proposal.

ALTERNATIVE EVALUATION FOR CONCEPT O

PROJECT:	TA-21 Material Disposal Area Capping Concepts and Strategies		
COMPONENT:	Cap	**FUNCTION:**	Prevent Migration

ALTERNATIVE DESCRIPTION

CONCEPT O. FULL PERIMETER WALL WITH INTEGRATED CAP DESIGN
(Formerly Concept O)

This proposal investigates the cost range for a single engineered cover over both the MDA-T and MDA-A waste regions. To reduce the need for a gradual declination of the north side of the single cap due to the sharp fall off in that region and also the lesser requirement for 'fall off' on the south side this proposal considers the inclusion of a north retaining wall of appropriate height to provide appropriate erosion mitigation of the cap for the 1,000 year life.

The cap will extend to slightly over the current perimeters of the two waste regions with the exception of joining the two waste regions together at the eastern most point of MDA-T and the western most point of MDA-A. The cap will be approximately 1,100 ft x 400 ft. All materials used in the cap are to be obtained locally and assumed to be suitable.

The north retaining wall will traverse the north perimeter of MDA-T and MDA-A being approximately 1,100 ft in length, 1 ft and 9 ft thick at the top and bottom respectively and have a height of approximately 20 ft to the steep drop off at its location adjacent to the north access road. The south retaining wall will traverse the south perimeter of MDA-T and MDA-A being approximately 1,200 ft in length, 1 ft and 7 ft thick at the top and bottom respectively and have a height of approximately 10 ft. A further 2 walls each of approximately 200 ft in length with a height of approximately 20 ft lowering down towards 10 ft to join the north and south walls. The walls will be built to appropriate ACI/ASTM/DoE standards to support longevity with the application of appropriate surveillance and timely repair. (Reinforced concrete cracks due to aging, settlement, and corrosive environs and one cannot really prevent this. That is why concrete is reinforced and the steel resists the tensile and flexural loads). Note that the retention wall does not have the function of preventing the migration of contamination its function is purely to prevent the erosion of the cap material.

ADVANTAGES / BENEFITS	DISADVANTAGES
• Cap footprint reduced by approximately 40% • Need for 3:1 slopes to eliminate cap erosion. • Retention wall is easily accessible for inspection purposes. • Project can be interrupted should budget constraints occur. • TA-21 D&D materials may be placed behind the wall. • Wall can be easily and economically repaired. • Cap footprint significantly reduced. • Anchoring of the wall due to the contiguous design.	• Additional fill volume will be required to adjoin MDA areas. • 1,000-year longevity justification. • Use of natural rock to build an adjacent or future wall. • Use of a replacement/redundant wall may need considered. • Concrete and/or coatings technology - slow progress.

IDENTIFIED RISKS:

Materials cannot be obtained and/or formed locally. Concrete technology does not allow justifiable extended concrete life.

Note: This proposal is mutually exclusive with other proposals.

COST COMPARISON FOR CONCEPT O

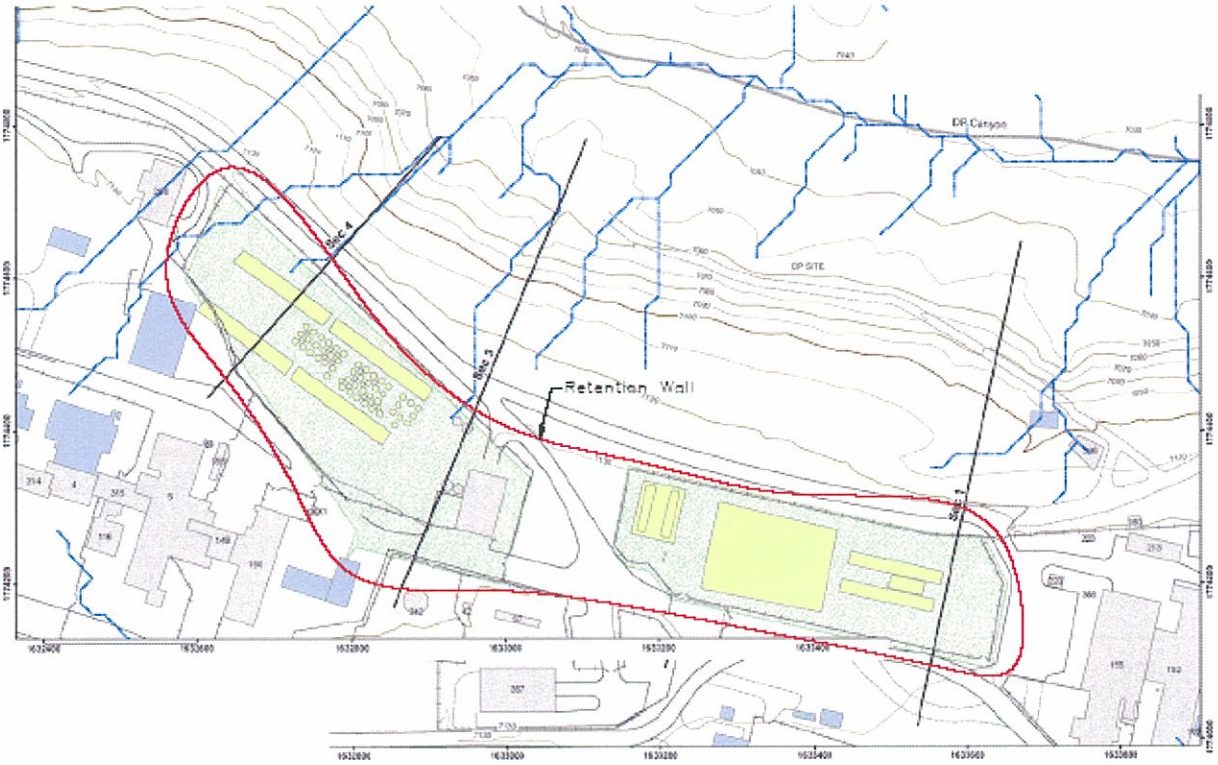
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

ORIGINAL CONCEPT	VALUE STUDY CONCEPT
$13.7M	$20M

COST ITEMS	NONRECURRING	LIFE CYCLE
ORIGINAL CONCEPT	$13.7M	
VALUE CONCEPT (-)	$20.0M	
SAVINGS	($6.3M)	
NUMBER OF UNITS (X)	1	
TOTAL SAVINGS	($6.3M)	
IMPLEMENTATION COSTS(-)	$20.0M	
NET SAVINGS	($6.3M)	

Notes:

Figure O-1. Concept O – Full Perimeter Wall



FPAG.VER

DESCRIPTION- VALUE STUDY CONCEPT O

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Background:

This VE study has proposed the use of a bare reinforced full or partial concrete retaining wall(s) around the cap of the MDAs.

Proposal:

Use an engineered reinforced concrete full perimeter wall in place of a skirt around the MDA-A and MDA-T combined waste area.

Assumptions:

There is abundant documentation available to predict a minimum life expectancy of 500 years for the concrete wall. The regulatory guidance specifies a 100-year active surveillance and maintenance period and then 900 years of passive containment. This proposal assumes that the concrete will meet that requirement. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

IMPLEMENTATION OF CONCEPT O

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

CRITICAL ITEMS TO CONSIDER IN IMPLEMENTATION OF PROPOSAL:

The physical configuration of the wall and the chemical composition of the cement must be carefully engineered.

IDENTIFIED POTENTIAL PROBLEMS AND METHODS TO OVERCOME:

This proposal assumes that the concrete will meet the requirement for a 1000-year life. It accepts the risk that the concrete may show degradation within the first 90 years. The mitigating assumption for this risk is that concrete technology is growing exponentially and that within the 90 years sufficient advances will be made to ensure that the cap can be repaired to a state that will last the additional 900 years.

It is imperative to note that cracks in the concrete will not result in its failure to meet its design function.

RECOMMENDED PROCEDURES: (WHO DOES WHAT)

LANL should contract the services of people or entities with extensive knowledge of the design and chemistry of concrete systems to take the lead on this proposal.

Supporting Documentation

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GENERAL DISCUSSION OF VALUE METHOD PROCEDURES USED IN THE VALUE STUDY PROCESS

General

The study team used a six-phase Value Method job plan for all value study operations. Short descriptions of the six basic Value Method phases performed during this team's meeting period and their operations are:

Phase 1. Information Phase
All possible information on the process and operational features within the scope of the study are collected, disseminated, and analyzed. The components making up the features, their functions, and costs are determined. The criteria and limits affecting the project or projects are identified, and if necessary, ranked and/or assigned values. A Function Analysis System Technique (FAST) diagram is generated which shows the "why" and "how" and "supporting" functions being performed. The results are categorized and assigned to functions of note. Items for potential concentration of study team effort are identified.

Phase 2. Creativity Phase
Creativity methods such as focused brainstorming and affinity procedures are used to generate the maximum quantity of ideas for consideration by the study team. This phase is also often referred to as the "speculation phase."

Phase 3. Analysis Phase
Ideas generated in the creativity phase are ordered, collected into concepts with similar features, solidified into potential alternatives for proposal, and ranked using one of a variety of techniques. The most common two techniques used for ranking are criteria weighting matrix and evaluation analysis ranking, and performance of the function determination and study team consensus potential versus difficulty ranking. The resulting ranked potential alternatives are then evaluated with regard to their benefits, advantages, and risks. This phase is also often referred to as the "evaluation phase."

Phase 4. Development Phase
Team members "champion" concepts or are assigned concepts that have the best potential for further evaluation and development into viable, efficient, and cost-effective alternative proposals. Each developed concept, that is carried to completion, is an alternative proposal that has an expectation of increasing the value for the client and/or owner of the product or process.

The development process includes, but is not limited to, using team member expertise; consultation with staff performing the project or process; experts and outside vendors; polling others by survey or other means; consultations with the client and/or owner; and review of information resources (libraries, catalogs, and other materials). Recommendations for methods to implement the proposals are identified, and methods to resolve identified potential problems are determined. During this phase, a determination to drop a process from further consideration usually requires unanimous acceptance by the study team.

Phase 5. Presentation Phase
Concepts that are fully developed by the study team which display apparent added value, by monetary or non-monetary measurements, are placed in report form for documentation and presentation as alternative proposals. Generally, these are concepts that have sufficient projected benefits that outweigh their potential disadvantages and risks. During this phase, concepts that are recommended as alternative proposals must, generally, receive unanimous acceptance by the entire team before report presentation and recommendation as an alternative value study concept.

GENERAL DISCUSSION OF VALUE METHOD PROCEDURES USED IN THE VALUE STUDY PROCESS

Some study team concepts or results may be identified to be of potential benefit to the client and/or owner, but cannot be sufficiently developed within the confines of the study time available. Alternatively, some concepts were studied but were not considered to have study team consensus, or in some situations, insufficient benefits to warrant their development when compared to other potentially higher value concepts that could be developed. Such concepts, that demonstrate a potential for added value, are presented as additional items recommended for further study. These items may, on occasion, require extensive additional development activities beyond that available to the study team to determine if the items actually demonstrate the anticipated added value.

Phase 6. Implementation Phase

The owner, users, client, and other project or process parties take the value study recommendations into consideration and evaluate them for implementation. The staff coordinating the value study activity, and if needed, study team members, assist and monitor the evaluation to help all parties in implementing the added value features. An estimate for the final resolution for the value of recommendations is established. The status of the final determination of the accepted recommendations and their estimated added value are reported to the coordinating staff as: accepted, partially accepted, or "withdrawn" due to the acceptance of another preferred proposal. If a proposal is rejected, the rejection and the reason for the rejection are reported to the coordinating staff. Statistics and value study activity results are compiled and reported to organizational management and oversight authorities.

Figure 1. Value Method Decision Process

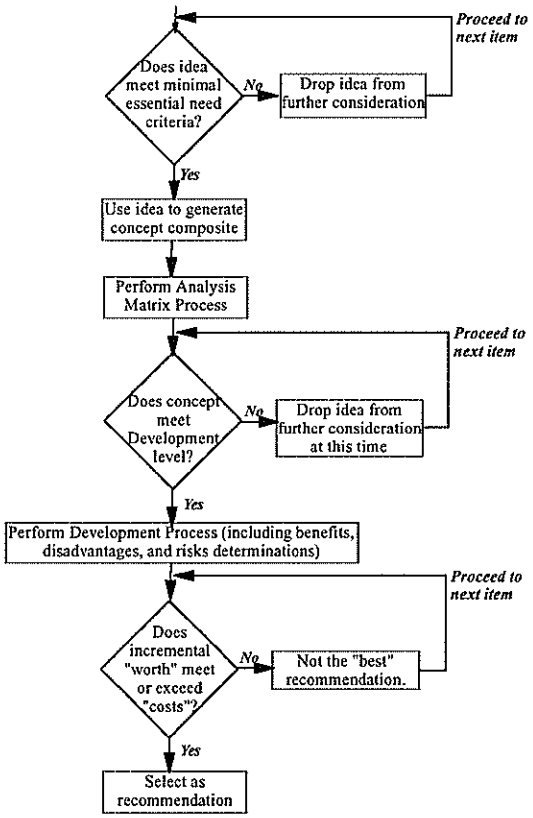
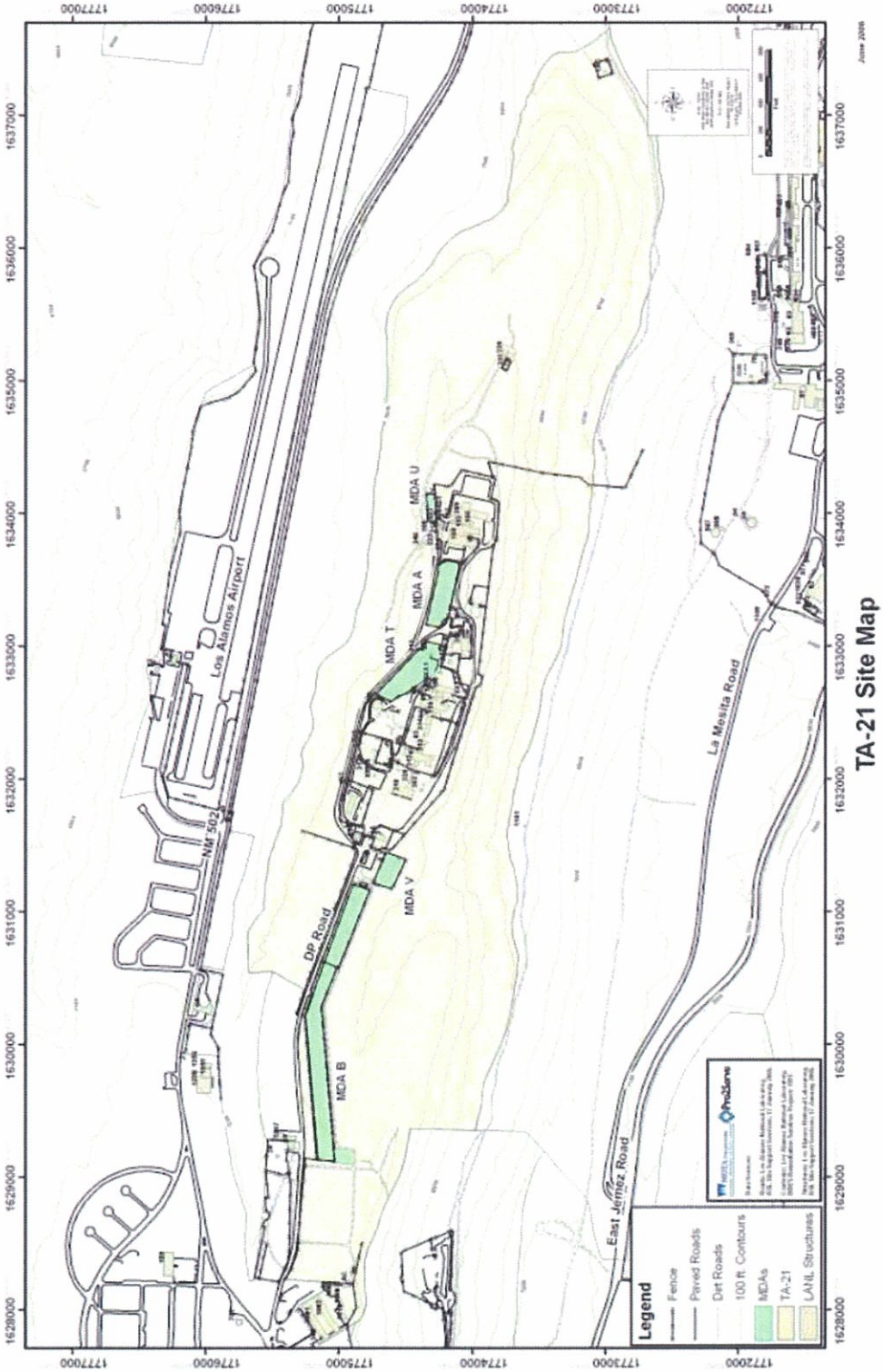


Figure 2. Location Map



DESCRIPTION OF PRESENT ACTIVITY PLAN

PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

The VE Team studied project was the latest available documents related to the statement of work for the decontamination, decommissioning, demolition, and disposal of the facilities in Technical Area 21 in Los Alamos, NM. These are the oldest facilities at DP West and they date to the late Manhattan Project era. They were used primarily in research related to the recovery and processing of plutonium. The primary purpose of the value study was to assist the Los Alamos National Laboratory (LANL) Technical Area (TA) 21 Site Closure Activities Project in planning for the closure of TA-21 in an efficient and cost-effective manner.

The following introduction, in whole or part, is from the August 2006 waste management plan used as the latest baseline for the value study:

The projected on-site waste includes those generated not only during the deactivation, decommissioning, and demolition activities associated with the structures at TA-21 but also those from the investigation and remediation of the material disposal areas.

The waste management plan divided the waste into five radioactive and one nonradioactive streams to accurately determine the costs for the disposal based on the various distances to the disposal sites. The current total estimated radioactive waste volume is 78,662 yd^3 and the nonradioactive volume is 1953 yd^3. The current management plan assumes that capabilities to reduce the waste volume and to package the waste will be available at TA-21 for the duration of the work.

The disposal facilities considered for the radioactive waste in August 2006 were LANL's TA-54, EnergySolutions in Utah, and the Nevada Test Site (NTS). The sites considered for nonradioactive waste were the Los Alamos County landfill and the Waste Management, Inc. hazardous waste facility in California. The waste acceptance criteria for each disposal site impact the waste disposal costs, and were considered in planning the waste's packaging and transportation.

Because of the waste's physical form, large volumes, and low levels of radioactivity, packaging in large containers was considered to be practical and efficient and reduced time, material, and labor resources required for loading. Transuranic waste, mixed low-level waste, and nonradioactive hazardous waste requires packaging in 55-gal. metal drums to meet the requirements for transport and for the waste acceptance criteria at the chosen disposal facility. Although the type of packaging affects the type of conveyance, it does not affect the number of shipments.

Waste is assumed to be generated over a four-year period, beginning in 2007. The most cost-effective and practical method of waste transport is by truck using intermodal-type packaging because railroad facilities are not locally available. Approximately 6700 shipments will be made in the four years of the project.

The cost components used for estimating the disposal costs for the wastes are packaging, transportation, and disposal. The costs were obtained from the transport and packaging subcontractors for the disposal sites to form the basis for the estimates. These costs were used for the waste quantities to estimate the total for the packaging, transportation, and disposal of the project wastes. All costs were escalated at 2% per year through 2010. The estimated costs range from approximately $26,000,000 to $79,000,000, depending on the disposal options chosen. The disposal at TA-54 carries the lowest estimated cost at $25,435,792; the disposal at EnergySolutions would cost $62,288,870; and the disposal at NTS would be the most expensive option at $78,839,091. Disposing nonradioactive waste is estimated to bring an additional cost of $168,54.

A special new consideration for the value study team is the relatively recent change to pricing for NTS disposal. The NTS disposal cost, excluding packaging, transportation, monitoring, and other required support costs, is to be zero for the next fiscal year (2008) and much less that historically present in future years. It is required that the quantity and timing of the projected shipments be submitted to upper management by mid-July 2007, if this option is to be taken is pursued.

DISCUSSION OF CRITERIA AND LIMITS ANALYSIS

Membership on the value study team was chosen in accordance with the multi-discipline concept and independence criteria. In general, each team member represented a specific technical, organizational, or community viewpoint. Full-time team members perform all aspects of the value study. Some team members are part-time. They often represent the technical areas and rarely participate in voting aspects associated with the value study effort. An effort to create a "balanced" team is usually made. (A team that is composed of people that represent several sides of the interests for the features being value studied.) Community preference and concerns were evaluated by the study team from knowledge gained at the site.

The parties and interests involved are identified and reviewed during the Owner, User, and Stakeholder (OUS) Analysis. Several approaches are common. This value study team used a listing approach to highlight the concerns and parties involved. Then a criteria weighting and alternative matrix analysis procedure was used. It was determined by the study team facilitator that the team was balanced enough to allow a one person, one vote technique for the matrix computations to determine the importance of the criteria and the selection of potential alternatives.

Stakeholders and Interested Parties

The Value Study Team examined interest documents from the following groups

Stakeholders

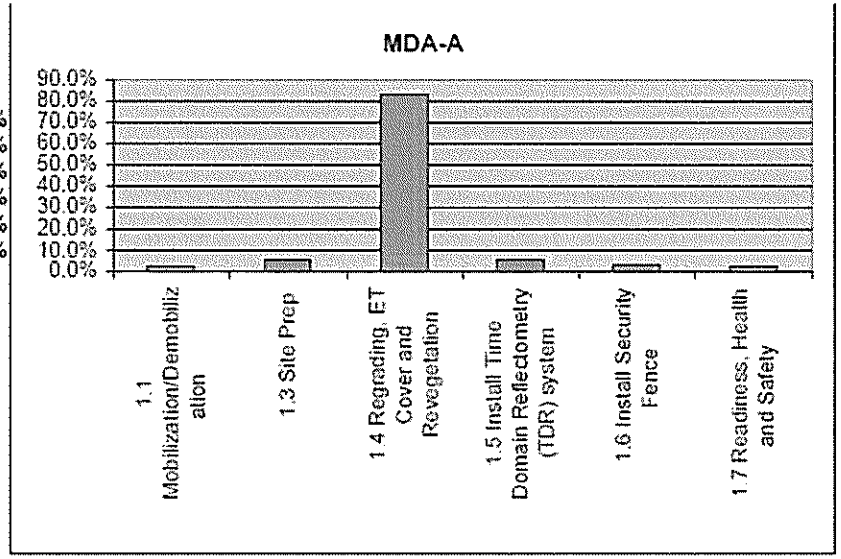
DOE/NNSA
LANL
New Mexico Environmental Department (NMED)
Santa Clara Pueblo
Pueblo de San Ildefonso
Jemez Pueblo
Los Alamos County Municipality
Residents of Los Alamos County

Interested Parties

Los Alamos Study Group (LASG), www.lasg.org
Concerned Citizens for Nuclear Safety (CCNS), www.nuclearactive.org

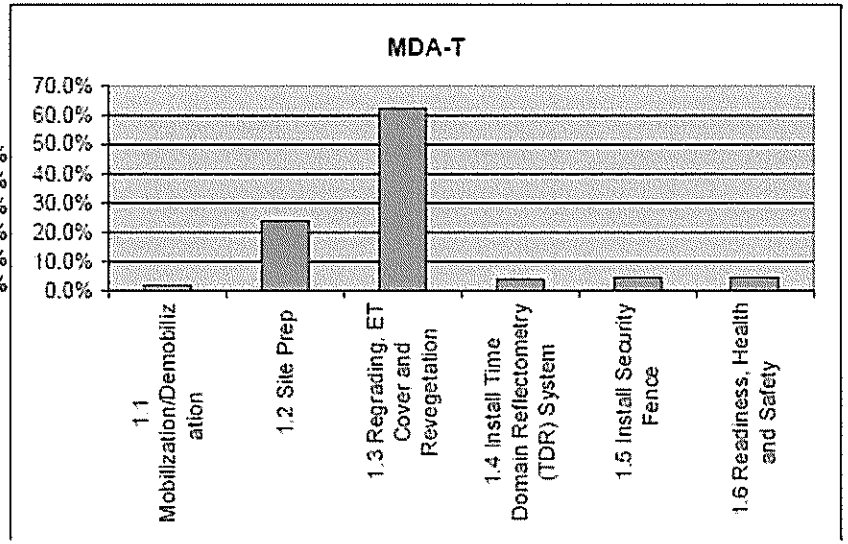
Estimated Costs:

Phase Names Direct Cost		
MDA-A ER Design Activities	$0	
1.1 Mobilization/Demobilization	$42,065	2.3%
1.3 Site Prep	$90,845	4.9%
1.4 Regrading, ET Cover and Revegetation	$1,528,107	82.6%
1.5 Install Time Domain Reflectometry (TDR) syste	$98,498	5.3%
1.6 Install Security Fence	$57,293	3.1%
1.7 Readiness, Health and Safety	$32,601	1.8%
	$1,849,609	



Estimated Costs:

Phase Names Direct Cost		
MDA-T ER Design Activities	$0	
1.1 Mobilization/Demobilization	$51,199	1.3%
1.2 Site Prep	$922,482	24.0%
1.3 Regrading, ET Cover and Revegetation	$2,387,176	62.2%
1.4 Install Time Domain Reflectometry (TDR) Syste	$151,557	3.9%
1.5 Install Security Fence	$166,068	4.3%
1.6 Readiness, Health and Safety	$161,297	4.2%
	$3,839,779	



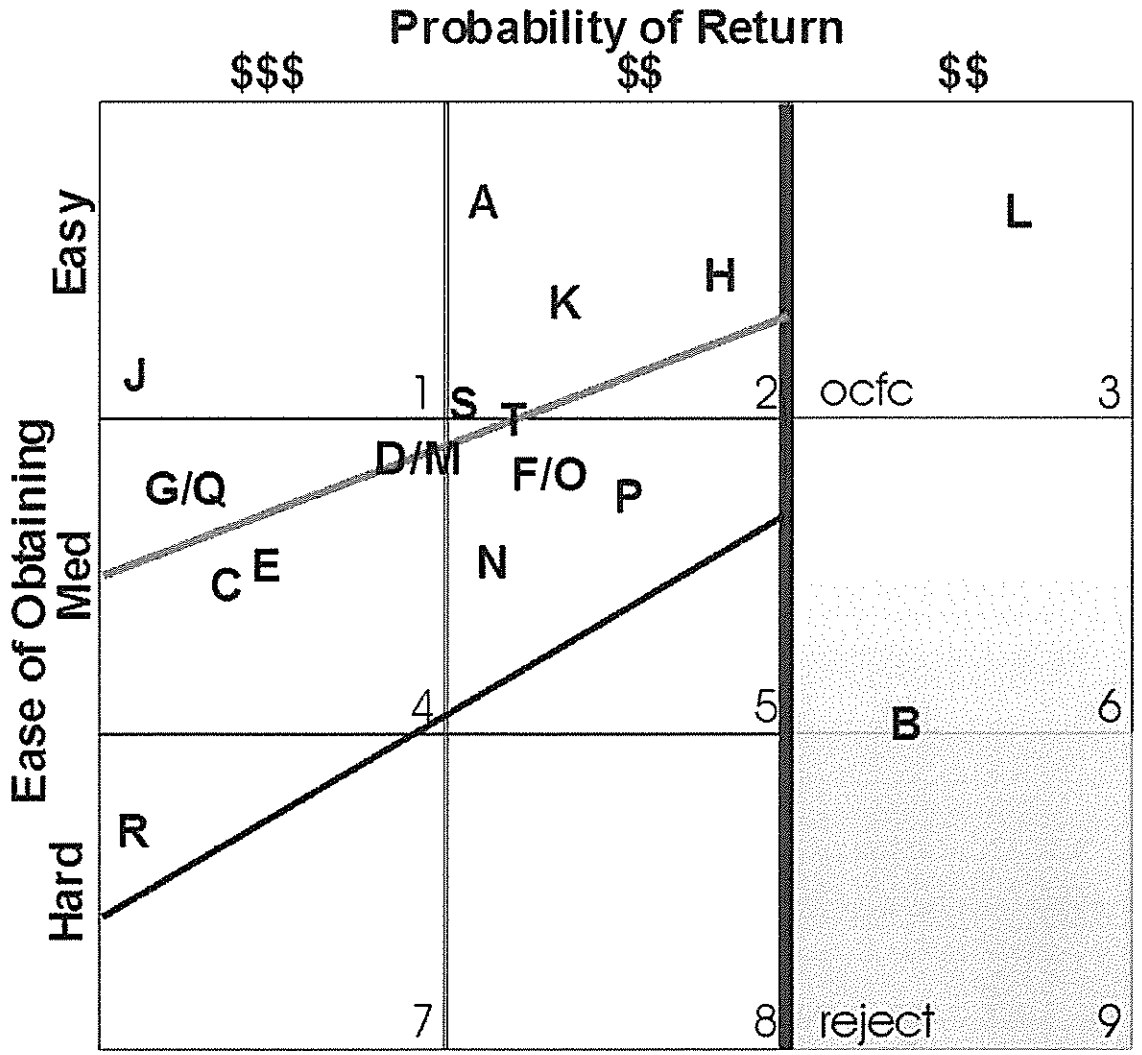
PROJECT: TA-21 Material Disposal Area Capping Concepts and Strategies

Using standard Value Method procedures, the value study team identified the more crucial factors in serving the basic function. Using a nine square system defining the ease of obtaining (by team members, project members, clients, and others) and potential value enhancement (to the owner, users and stakeholders), the team determined an initial priority ranking for each concept.

As a result this ranking, concepts were identified as priority one (immediate development attention), priority two (develop if at all possible) and priority three (develop if time permits). Concepts not meeting these criteria, and those that that time does not permit further development, are then broken into three major areas:

1. Deemed as worthy of mention as another concept for further consideration (but not studied due to other higher potential of other concepts or insufficient expertise and/or time to study within confines of team efforts),
2. Not deemed worth further effort, and
3. Discarded for cause.

PRIORITY SELECTION PROCESS RESULTS



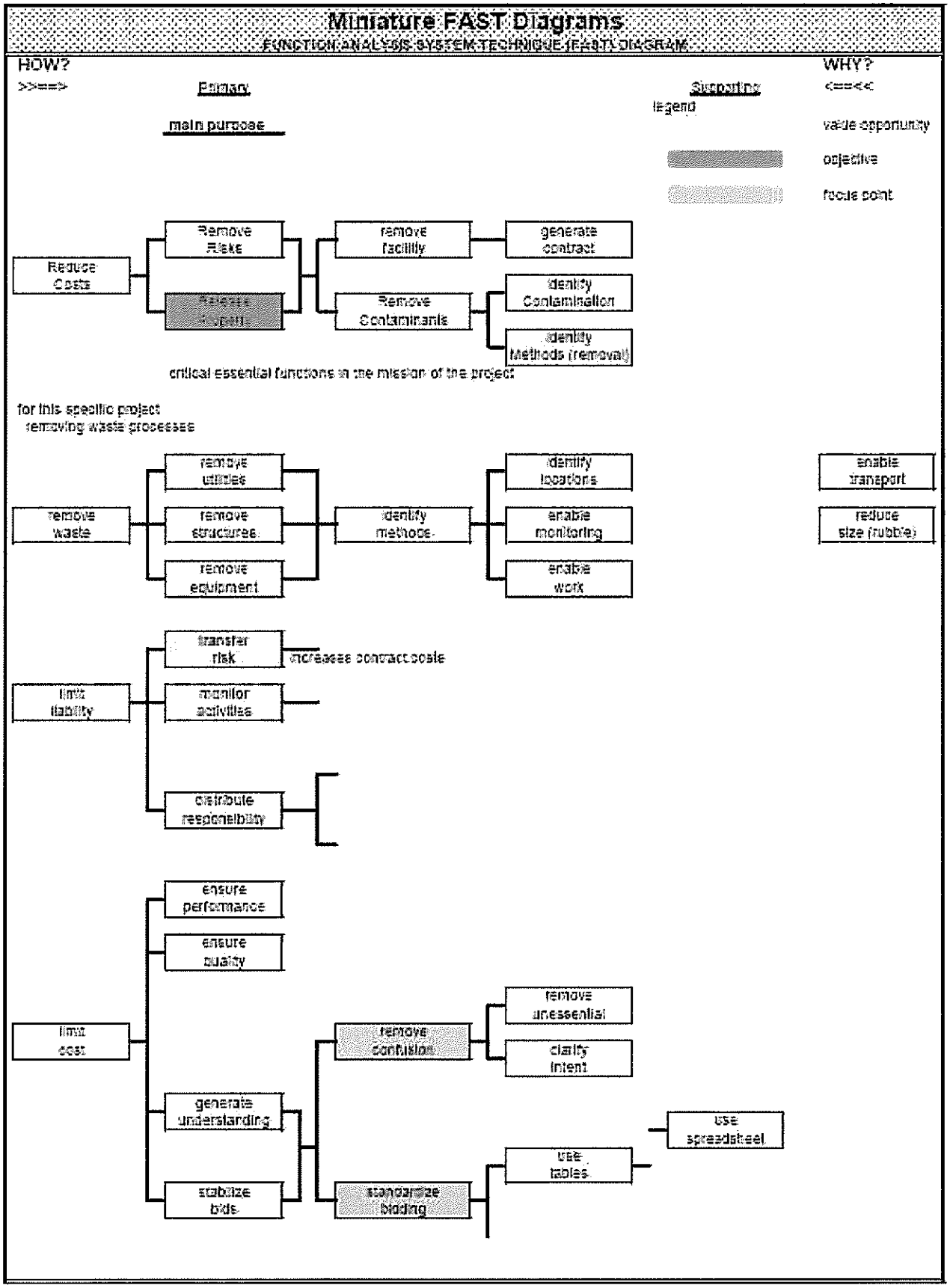
COST MODEL AND ESTIMATE INFORMATION

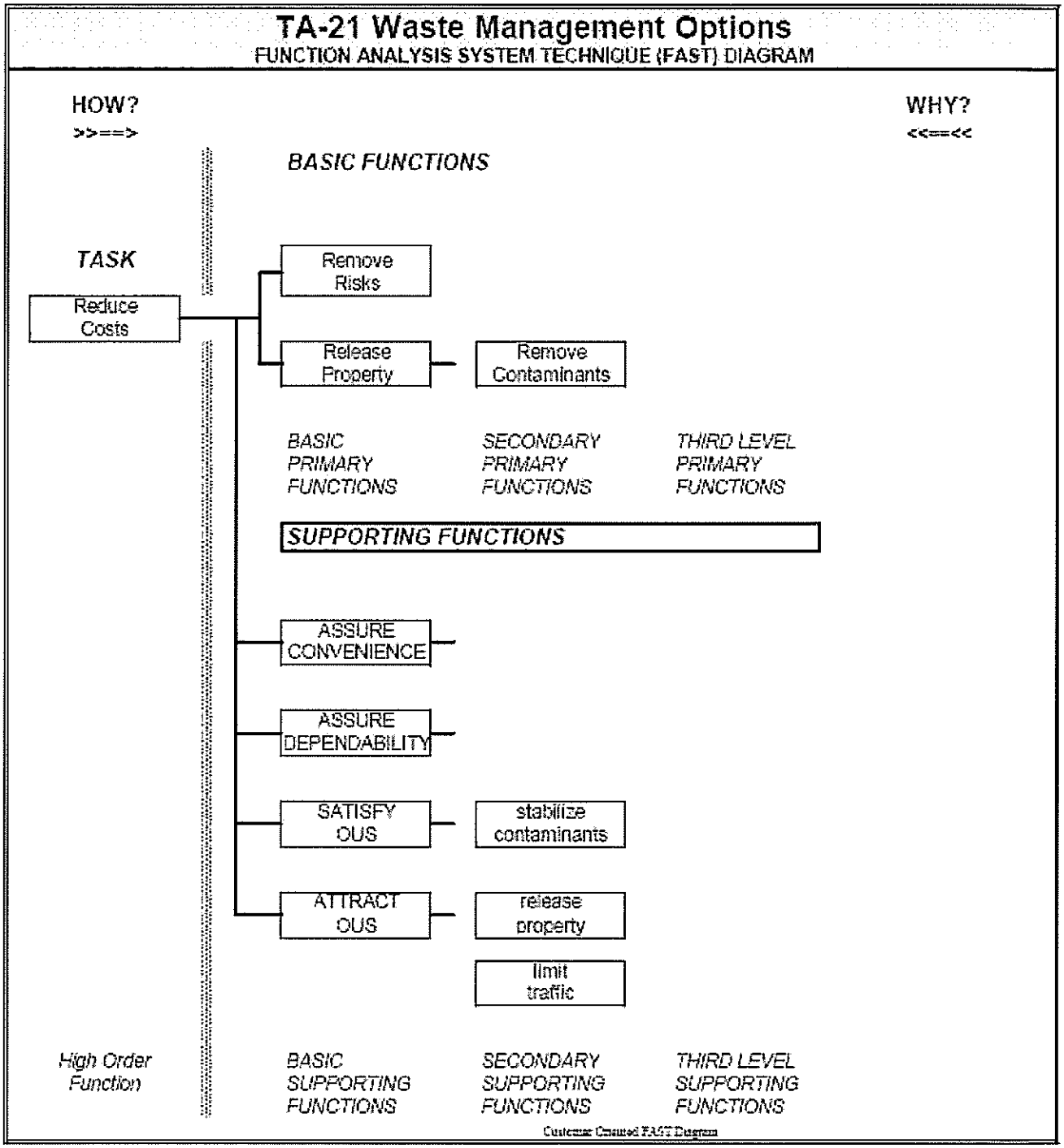
The team's cost model was based on the conceptual estimates provided by the design (or process) team for the preferred concept that was presented to the study team. It was used to focus on features with the greatest potential for savings, and to highlight potential instances of value mismatch. (Areas that have low worth in comparison to their projected cost.)

To ensure reliability and applicability, both estimators and the study team reviewed all unit prices. Estimator(s) were independent from both the study team and design and process team. Value study proposal and original concept estimates are of the same general level of development. It should be recognized that unit costs and estimates might vary as final activities are pursued and refined.

FUNCTION ANALYSIS SYSTEM TECHNIQUE (FAST) DIAGRAM

The value study team used the function-analysis process to generate a function-logic diagram. It is often referred to as a Function Analysis System Technique (FAST) diagram. A FAST diagram shows the "why" and "how", and "supporting" functions being performed. Items for potential concentration of study team effort were identified through the FAST. These functional tools aided the team in identifying crucial features that are pivotal to meeting requirements that support critical issues (basic function and critical-path functions). It also highlights those functions that meet the activities less critical objectives (supporting or secondary functions). The development of the FAST assists the team in identifying any potential value mismatches and expedites the team's efforts in generating a common understanding of the activity's purposes and applicable governing criteria.


Miniature FAST Diagrams
FUNCTION ANALYSIS SYSTEM TECHNIQUE (FAST) DIAGRAM
HOW?
>>===>
Primary
main purpose
Supporting
legend
WHY?
<===<<
value opportunity
objective
focus point
Reduce Costs
Remove Risks
Remove Liability
remove facility
generate contract
Remove Contaminants
identify Contamination
identify Methods (removal)
critical essential functions in the mission of the project
for this specific project
removing waste processes
remove waste
remove utilities
remove structures
remove equipment
identify methods
identify locations
enable monitoring
enable work
enable transport
reduce size (rubble)
limit liability
transfer risk
increases contract costs
monitor activities
distribute responsibility
limit cost
ensure performance
ensure quality
generate understanding
stabilize bids
remove confusion
remove unessential
clarify intent
standardize bidding
use tables
use spreadsheet


TA-21 Waste Management Options
FUNCTION ANALYSIS SYSTEM TECHNIQUE (FAST) DIAGRAM
HOW?
>>==>
WHY?
<<==<<
BASIC FUNCTIONS
TASK
Reduce Costs
Remove Risks
Release Property
Remove Contaminants
BASIC PRIMARY FUNCTIONS
SECONDARY PRIMARY FUNCTIONS
THIRD LEVEL PRIMARY FUNCTIONS
SUPPORTING FUNCTIONS
ASSURE CONVENIENCE
ASSURE DEPENDABILITY
SATISFY OUS
stabilize contaminants
ATTRACT OUS
release property
limit traffic
High Order Function
BASIC SUPPORTING FUNCTIONS
SECONDARY SUPPORTING FUNCTIONS
THIRD LEVEL SUPPORTING FUNCTIONS

VERBAL PRESENTATION MEETING ATTENDANCE LIST

TA-21 Material Disposal Area Capping Concepts and Strategies
VALUE STUDY
12:00 p.m., August 29, 2007
Location: TA-21 Site Closure Team Meeting Room

NAME	CODE/OFFICE	PHONE/e-mail
Ron Rager	LANL, EP-TA-21	505-231-7834 rrager@lanl.gov
Allan Chacoupka	LANL EP-TA-21	505-231-1343 allanc@lanl.gov
Bill Atkin	LANL	batkina@lanl.gov
Jim Ferguson	Northwind-Inc, Los Alamos	505-661-4290 jferguson@northwind-inc.com
Bruce Wedgeworth	LANL, ERSS-TA-21	brucew@lanl.gov
Sean Finch	LANL, WS-LLWD	505-6675953 sbf@lanl.gov
John Tauxe	Neptune and Company	505-662-0707 ext 15 jtauxe@neptuneinc.org
Bill Criswell	LANL EP-TA-21	505-699-2979 bcriswell@lanl.gov
Woody Lance Woodworth	DOE Facility Representative TA 21	505-665-5820 lwoodworth@doe.al.gov
Julian Boyance	Northwind, Inc.	505-661-4290 jboyance@northwind-inc.com
Pete Maggiore	Northwind, Inc.	pmaggiorea@northwind-inc.com
Bob Anderson, PE	Robert T Anderson Consulting	803-648-2177 banders@mindspring.com
Rich Dabolt	MOTA Corporation ESH & QA Manager	803-794-1449 rdabolt@motacorp.com
Chuck Negin, P.E.	Project Enhancement Corporation Executive Consultant, Sr VP	240-686-3959 cnegin@pec1.net
Michael D. Papp, BEng (Hons), CEng MIEE	MOTA Chief Operations Officer Nuclear Services	231-881-3155 mpapp@motacorp.com
Eric Johannsen	MOTA Project Manager	419-707-0617 ejohannsen@motacorp.com
Conrad Cooke	MOTA Corporation	803-794-1449 ccooke@motacorp.com
Joe Hebert	MOTA Corporation	505-662-7350 joe.hebert@motacorp.com
Sam Martin, PE, CVS, CVC, CVT	SAMI VE LLC	301-591-1745 FAX 720-554-7678 smartin@samive.com
Carol Landau	AcumenVE	724-858-6228 clandau@acumenve.com

TECHNICAL PREBRIFING MEETING ATTENDANCE LIST

TA-21 Material Disposal Area Capping Concepts and Strategies
1:00 p.m., June 26th, 2007

NAME	CODE/OFFICE	PHONE
Ron Rager	LANL	505-231-7834 rrager@lanl.gov
Bill Criswell	LANL MS C 349, EP-TA21	505-699-2879 batkina@lanl.gov
Mitch Goldberg	LANL, EP-TA21	mgoldberg@lanl.gov
Bob Anderson, PE	Robert T Anderson Consulting	803-648-2177 banders@mindspring.com
Rich Dabolt	MOTA Corporation	803-794-1449 rdabolt@motacorp.com
Joe Hebert	Joe Hebert Consulting	303 776-7357 joe.hebert@comcast.net
Dr. Wayne Gaul	Chesapeake Nuclear Services	803-732-1017 wgaul@chesnuc.com
Julien Boyance	MOTA Corporation	505-662-7350 jboyance@motacorp.com
Sam Martin, PE, CVS, CVC, CVT	SAMI VE LLC	301-591-1745 FAX 720-554-7678 smartin@samive.com
Carol Landau	AcumenVE	724-858-6228 clandau@acumenve.com

INITIAL BRIEFING MEETING ATTENDANCE LIST

TA-21 Material Disposal Area Capping Concepts and Strategies
9:00 a.m., June 20th, 2007

NAME	CODE/OFFICE	PHONE
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Rich Dabolt	MOTA Corporation	803-794-1449 rdabolt@motacorp.com
Joe Hebert	Joe Hebert Consulting	303 776-7357 joe.hebert@comcast.net
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Julien Boyance	MOTA Corporation	505-662-7350 jboyance@motacorp.com
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Carol Landau	AcumenVE	724-858-6228 clandau@acumenve.com

Daily Minutes

WEDNESDAY AUGUST 22, 2007
LANL TA-21 Material Disposal Area Capping Concepts and Strategies
Value Engineering Study MOTA/LANL/SAMI

Initial briefing 9am
LANL personnel joined the value engineering team at MOTA offices located at 1460 Trinity Dr, Suite #2, Los Alamos, NM 87544 at 8:45 for the initial meeting. Sam Martin made introductions and gave orientation for the group value engineering study for the week of Wednesday, August 22nd through Wednesday August 29th.

The technical value engineering team consists of:

Bob Anderson, PE – Consultant Nuclear Hazardous Waste, 40 yrs nuclear exp, Aiken, SC, cell - 803-292-9000
Rich Dabolt – MOTA Sr Proj Mgr, 40 yrs nuclear exp, Columbia, SC
Chuck Negin, PE – Project Mgt Corp, Navy, 3MileIsland, DOE DND, Germantown, MD, cell - 301-526-2858
Michael D. Papp, BEng (Hons), CEng MIEE – MOTA Chief Operations Officer Nuclear Services, Columbia SC
Ron Rager – LANL, 505-231-7834, rrager@lanl.gov
Conrad Cooke – MOTA Manager Government Operations, 803-794-1449, cell: 803-646-4001
Joe Hebert – MOTA Engineering and Project Mgt for Rocky Flats D&D, 303-776-7357, cell 303-994-8957
joe.hebert@comcast.net 1123 Purdue Dr, Longmont, CO 80503

Ron Rager, Project Lead for the Technical Area 21 from LANL spoke about the history of TA-21 and performance assessment at MDA A and MDA-T. Disposal and what is demolished drives the future costs down the mesa. Rad cleanup continue to be driven by New Mexico Department of Mexico RCAA EPA regulation. DOE is currently accepting level of cleanup by RCAA regulation.

Graph A analysis Estimate Documentation Report. Draft RA's analysis. Preliminary reviews of LANL proposals by DOE look acceptable. MDAT solid waste mgt unit bounded by fence cat 2 nuclear facility because of the qty. Investigation shows two short trenches from the 1940's. SWMU extends around two trenches, early 1980's excavated area, and ductwork went in area. Inventory and history is sketchy. Mesa wide trillium and phorase are major issues. Bag houses.
(2) 50,000 gallon tanks, also called the General's tanks, from 1945 non-disposable rad waste. Left heel, 6" in bottom of tank, but contained 80% of inventory. Emptied and maintained thru 1984
8' below grade, steel plate cover.

Check out cap, leaching trillium north areas plutonium bubbles, process water. Area is going to stay industrial under DOE control. MDA A &T by 2010 to be capped. In order to get to solid waste mgt underneath, the buildings must be removed. Don't know what funding is until 2009. Whole mesa was to be closed by 2012, but off schedule.

Wednesday August 22, 2007 afternoon discussions:
Sam reviewed basic value engineering definition and principles focusing on the job plan including: 1) selection 2) Information - Initial Meeting, Discussion/Review, Site visit, Function Analysis Paretos80/20, FAST diagrams 3) Creating 4) Analysis 5) Development with due diligence 6) Pre-briefing 7) generate documents with justifications and present this with the reasons behind it to management at the presentation session next Wednesday August 29,

Sam covered the week's schedule:
Wednesday and Thursday Creativity and Analysis phases
Friday: Development phase
Monday: Continue development activities
Monday and Tuesday will schedule status meetings as needed
Tuesday 1PM: Briefing with LANL personnel
Wednesday: 12 noon Presentation to LANL management

4:00PM team debriefing

Clarifying scope discussion: Chuck mentioned in response to Rich's request for better definition of scope that the team could further study and provide details for items such as integration with an overall area cap, idea of the trench for the demolition materials, the cap design documentation. Rich mentioned another approach with integration with bigger picture concepts and he is concerned with the report that indicates leaching issues on the north side.

Bob made a drawing on the whiteboard of ideas for using rubber capping that addresses the water, native materials, concern of leaching issues. ET caps main purpose is to prevent intrusion by water, animals, and plants. Concern with lateral movement of rad waste. Slope stability erosion concerns.
What is the stability of the natural materials with proximity to edge?

The technical team toured the MDA-A and T areas after a working lunch discussion.
2:30pm discussion continued about slope issues with board drawing discussions. Various cap and barrier wall alternatives discussion followed, referencing DOE materials.

THURSDAY AUGUST 23 Status meeting 8:00am:
Bob referred to the documentation "Requirements for cleanup for radioactive sites", team discussed for clarification compliance; 100 meters, buffer zones - distance directly from waste placement, horizontal wells, thousand year life, 30 yrs active maintenance with 100 extension, look for ways to simplify maintenance and monitoring. Any ideas to minimize maintenance? Concrete wall along north perimeter. Clarify if road must stay. TA-61 area soil, is that where biomaterial coming from?
Examine contamination levels in the canyon before any capping operations are performed. Horizontal monitoring wells - not sure whether it's surface or from underneath only on the north side. Rich referenced Proposal 12 from last VE study "Use of LANL database radiological contamination across the site."

Conrad supplied MDA-A and MDA-T detailed drawings for slope issues mainly. Estimated costs by phase categories as prepared by Conrad were projected on the wall and the team discussed where the major costs are and possible alternatives. Project elements include: Project mgt, project support (engineering, AQ), mobilization/demobilization, time domain reflectometry (TDR) Readiness Health Safety, Monitoring. Baseline includes: site prep, regrading cover revegetation, and security fence. Alternative: Site prep, regrading cover revegetation, retention wall security fence

Chuck to work on detailed estimate sheets to create standard estimate for consistency.

Team divided into two groups. Bob and Rich working on Re-use and Capping/revegetate
and Mick and Chuck working on Barrier & security fence and Site prep.

Concepts were developed and put up on the board and team members selected which areas they would work on to develop into proposal.

Thursday August 23, LANL meeting 10:00am:
Dwayne Parsons (Mike Medonia), Bruce Wedgeworth joined VE team.
Don't make assumptions regarding the preliminary studies. Sam passed out LANL cost sheets for MDA-A and MDA-T.

Rich mentioned system rate costs - Lacer has DOE approved labor rates, need a copy of that list. Ron said he'd try to get a copy from the racer database. Multisheet cost components. 1.3 million and 1.4 are combined in summary.

Scheduled 10:00am Friday during analysis phase LANL to with team.

Racer has standards for cost estimating. Ron said he's less concerned with costs, more with technical analysis. Ron mentioned a bio layer. MDA-G doesn't have a bio layer so they have a 25' thick cap. Valuable to use a bio-layer, 8' good number to use. Can use vertical walls, slot trenches 25' deep. Envelope calculation 25' wide trench.

D&D, Waste Disposal, Capping - three VE studies to date. LANL plans to integrate all the value engineering studies for TA-21 for first quarter of FY-08, likely around November 2007.

Chuck with feedback from the team is creating a working estimate sheet for the team to include:

Common elements:
Project management & Project controls, Project support (Eng, QA, QC), H&S oversight, Remove sludge from tanks, Monitoring bore holes, TDA, Slab demo

Base case (east end waste stays)
- Mobilization/demobilization
- Site prep @ grading
- Cover material from TA-61 (6' from TA-61 plus slope, 2' from TA-21, 2' bio layer)
- Revegetation
- Retention wall (enhanced toe in NW area)
- Security fence

Variations
- Retention wall (several options)
- Remove east end waste (1 case)
- Place TA-21 demolition waste (1 case)
- Obtain cover soil from remote end of plateau (No-don't estimate from discussions)
- Rubblized concrete for bio-layer
- Reduced cover area (2 cases)

Thursday August 23 4:00pm LANL meeting:
Mike Moran and Ron Rager from LANL joined the team Thursday at 4:15 to have Mike speak about RACER. RACER = Remedial action cost engineering requirements - an estimating tool developed by the Fed govt. Earth Tech is under contract to the government to provide software support. RACER offers templates for various treatments for hazardous waste. Unit rates are updated annually based on actual remediation projects to maintain a price book focused on environmental remediation. Labor equipment materials are included. Strong in the environmental, watershed D&D, most of the MDAs use RACER. Parametric estimating database for cost estimating. Chuck requested clarification and ok to use LANL's existing projects that used RACER. Excel interfaces and RACER uses a 'wizard' approach. The key is to use the same assumptions. Proprietary database issues, keeping in the VE vein of independence and time constraints for one-week study. As Mike is off-site next week, Cathy Toth can assist with the RACER estimating 865-483-6837. Team will call Friday to make arrangements for next week. P1/Q can be dropped as the east fields are not included.

Meeting 9am Friday with Bruce Wedgeworth and Ron Rager.
plutonium, tritium Micro nano pico

FRIDAY, AUGUST 24, 2007 8:00am VE team members meeting:
Discussion about the Estimate Documentation Report which had been passed out to all team members for Thursday night reading. Numbers match with 80,000 cubic yards for MDA-T, 3% slope and taper was included in LANL MDA-T fill requirement estimate. Accommodate for worst-case rainstorm, and annual rainfall amounts. Clarify 10' or 8' does it include bio layer. Need 8 feet of fill as basis for estimates. 735 for T. Cross dimension 367. In each direction is 92 feet of sloped area. For T: 548ft 252ft slope 70.5 ft for A. Mick made drawings on the white board of the dimensions for the combined factors.

Friday August 24, 2007 LANL Meeting 9:30am:
Bruce Wedgeworth and Ron Rager joined the team Friday morning for continuing question and answer time. Bruce is Project Lead for MDA-A and MDA-T and is in the pre-conceptual design phase for the capping. Characterization work, bore samples, outside of disposal units been tested. They are not touching waste as this is prohibited. Historical documentation indicates contamination outside containment areas. Paleo channels discussion, concern about capping over problems. Assurance was given that this is surface contamination and not a problem from leakage as there is concern with capping over something that requires deeper remediation. T and slope north of MDA-A have low-level waste contaminate migration. Ron mentioned that it is near surface contamination in a solid waste mgt unit, clean out that slope and pull that back in. Base case assumption contamination on north side are surface, not migrating. Cap was put in 1980's. Desire to cut moisture off at surface.

Chuck began teams work status report. Chuck spoke about base case elements and desire to do estimating within the team and

will not need the services of Kathy for RACER. Chuck went over the common elements written on the white board. Fundamental assumptions discussion. Combine site prep and grading together. Cover material is separate.

Look at alternatives to concrete for retention wall to meet 1,000 yr requirement. Ron suggested looking into Rock groin to meet 1,00 yrs NRC criteria.

Mick discussed retention wall options, footprint reduction, fill requirements, base case is concrete. Concern with lateral transgression of area contents regarding cap footprint.

Rich covered contamination control concerns. Bruce shared that there is a well study going on currently, there is a map of existing wells. Bruce will bring over the hard copy of the well map. Monitoring is a cost that needs to be captured for closure, it's not included in this capping study.
Flutes, balloons screens for horizontal monitoring.

Ron responded that the alternative road to minimize town traffic may not be a realistic alternative due to a historical trail off end of mesa restraint and other reasons.

Bob covered calculations and key parameters. Requirements include worse case evapo-transpiration 8-9 feet for basic soil. 1-2 feet for cap. Went from 110 to 140 yards of dirt. Integration with using demolition rubble and steel. Idea to use space in between A and T for lag storage to optimizing area. Land fill surveillance from other sites uses time stamping from electronic devices to provide history and analysis over time with reference points using data loggers.

Chuck covered what advantages might be gained from regulatory perspective: Barrier concept can be phased, look at D&D and cover systems as an integrated project, showing progress steps, negotiate consent order and milestones (negotiated each year). Spreadsheet usage offers advantage of knowing the basis for the numbers - where did they come from.

Ron and Bruce expressed satisfaction with team's progress to date. Meeting ended 10:18am.

Team continued on their assigned proposal development work.

Friday status meeting 4:00pm:
Rich C and J were dropped to OCFC after meeting with Ron Rager. S and T are new proposals, Chuck needs production rates, crew rates, dollars per hour figures for a spreadsheet consistent among the team members. Bob has 3 proposals, working on electronic digital monitoring proposal.
Chuck has nearly completely the combined spreadsheet for case estimating and will email it to Richard. As part of the base limit it to 2-yr schedule. Use overnight dollars. Mick is leading 4 areas, populating spreadsheets, quantification of costs for fill and walls.
Next status meeting is Monday 2:00pm
Technical pre-briefing Tuesday 1:00pm
Presentation on Wednesday at noon.

The team worked on their respective assignments over the weekend.

MONDAY AUGUST 27, 2007:
The team continued working on proposal development.

Team Status Meeting 1:00pm:

Sam started off the meeting with an overhead review of the teams list of proposals and started with Bob - working on A, H most of write up is done working on cost estimate. E using old proposal as guide. Chuck working on cap designs, just started work on integration of cap activities, most of primary alternatives are costed - going thru variations. Mick asked to change the titles to: Q Cap specific to each MDA close proximity P - Cap specific to each MDA - developed and costed, working on the estimates with planning illustrations. Bob asked about 'baseline' cap calculations, Chuck has them in D/M. Completed draft on horizontal mon K for Rich. Rich hasn't started on concave cap, T-enhanced retaining wall is nearly done by Rich.

TUESDAY AUGUST 28, 2007:
10:00am status meeting. Reviewed teams progress on proposal development and exchanged data figures for costing. Next meeting is 1:00 with full technical team starting with the baseline design. Will meet in the larger room for the afternoon meeting; Mick to provide printouts.

1:00pm pre-briefing LANL/MOTA team meeting:
Introductions started at 1:05 of the LANL/MOTA/SAMI technical team meeting. The following were in attendance:

Joe English	Regulatory Compliance	cenglish@lanl.gov	7-9641
Bruce Wedgeworth	MDA A&T Project Lead	brucew@lanl.gov	231-0108
Duane Parsons	TA 21 D&D Project Lead	duanep@lanl.gov	412-3356
Julie Minton-Hughes	TA-21 Operations Mgr	jernh@lanl.gov	699-1497
Valerie Rhodes	TA-21 Engineer	vrholes@lanl.gov	699-4529

Chuck began by talking about using a base case of a single cover over MDA-A&T 8.5 ET layer covered by 1.5' thick bio-layer except in NW canyon where canyon falls off steeply where it is proposed to use a toe wall. The disposal pits on east end will not be exhumed assumption. All utilities will be removed. North road paving removed. Source of material: fill from TA-61 and the bio layer will come from local sources, dimensioned or screened rock. Assumption of monitoring wells - both vertical and horizontal wells. Estimating assumptions RACER results could not determine the basis for calculations. Field work is conducted by sub-contractors, project mgt support, Q&A, safety, 3 days training for all workers, all estimates are conceptual, G&A of 13% markup and subcontractor marked up the same.

Mick followed with five topo maps on the wall covering potentials about the footprint, toe, retention wall, north access road, 2 caps or 1 cap option, center section for D&D storage, and other various approaches. Wall design approaches key issue includes 1,000-year life.

Rich reviewed the well maps, there are 32 deep and 51 shallow wells for environmental monitoring. Technical documentation indicated down gradient placement. Unique topography offers horizontal wells, which will offer less costly maintenance. Installing ET cap has a nominal slope from center out to the edges for rainwater drainage, dehydration is a problem weakens, cracks. Why not make the cap concave to maintain water levels. Various types of retaining walls, concrete, gabions (sacrificial erosion layer of wire baskets of rocks) and boulders have been cost estimated.

A question was answered about the wilting point of a concave shaped cap proposal has LANL documentation covering absorption rates. Ron asked if the team had considered alternative sloping configuration and Bob covered reasons behind the design. Concrete can last 1,000 years by design, water being the major problem. Bob covered other sites solutions using concrete. Chuck brought up the 99 years evaluation time for concrete performance evaluation.

Bob spoke about the D&D materials beneficial reuse of soil, concrete, and metals. Cost of offsite storage is up to $40/sq ft. Two areas examined were beneficial reuse of materials in cap itself and using middle area for storage. Rubblize concrete 4,000 cy concrete scabbling technique to skim walls, then analyze materials. Bio-intrusion layer or barrier, looked at guidelines, $10/yard to reuse onsite.

Caps are 600 ft, 550 ft, 450 ft; gap of 150 ft in middle; make one continuous cap offers a middle space of up to 5,000cy material storage. Remote electronic surveillance of the cap for monitoring, walk down, and proof to meet on-going requirements.

Chuck covered various regulatory requirements, overview of the entire mesa, showing rate of progress advantages by using milestones.

Chuck offered assistance with spreadsheet work for cost estimating. Recommended that RACER usage is covered at Wed noon final presentation.

Make cover bigger so that slabs would cover other areas was mentioned by Duane and Ron responded that this was not in project scope. Chuck brought up other D&D sites solutions.

Will exposed slabs remain? Write the D&D specs to leave slabs, if dirt does not need to be remediated, leave slab in place and cover it. What release criteria is applicable? DCGLs for all materials will need to be developed. 5400.5 criteria must be met. No res/rad - difficult to get agreement for release criteria. The inner fenced off area is planned to be under DOE control.
Make schedule reflect consent order. Consent order addresses separate areas and does not cover the overall view.

Duane asked about one big cap option, which was and is still an available option. This would cover about twice the size of MDA-T and MDA-A combined plus middle area. Rich brought up that this would perhaps be a size of 25' high.

Ron mentioned a prior design of a concave cap that included a drain.
Mick asked for feedback from LANL - Duane brought up an example of a 1,000 yr cap. Bob brought up that analytical tools are available such as from the universities to assist in the design to meet 1,000 yr requirements. Ron mentioned an example of acceptance 10 years from NRC of 500 years. Idea of redundancy and enhancements mentioned Ron. Advantage of vertical side slopes is no erosion.

Meeting ended 2:20pm.

Sam covered with the VE team a sample overhead presentation similar to the one being developed for tomorrow.

WEDNESDAY AUGUST 29, 2007:

The team completed submission of materials for the presentation report and the presentation slide show to be covered today after a dry run practice session.

Wednesday August 29, 2007 FINAL PRESENTATION MTG AT LANL 12:00 noon:

The team presented the results of this VE study to LANL and others starting at noon on Wednesday August 29th at the LANL TA-21 meeting room.

TA-21 Presentation Wed Aug 29 12:00pm Attendees:

Woody Woodworth	DOE/LASD	lwoodworth@doeal.gov	505-665-5820
Bill Atkin	LANL	batkin@lanl.gov	505-699-0734
Allan Chacoupka	LANL EP TA-21	allan@lanl.gov	505-231-1343
Brill Criswell	LANL EP TA-21	bcriswell@lanl.gov	505-699-2979
Ron Rager	LANL	rrager@lanl.gov	505-231-7834
Bruce Wedgeworth	LANL	brucew@lanl.gov	505-231-0108
Conrad Cooke	MOTA	ccooke@motacorp.com	803-794-1449
Rich Dabolt	MOTA	rdabolt@motacorp.com	803-794-1449
Joe Hebert	MOTA	jhebert@motacorp.com	505-662-7350
Eric Johannsen	MOTA	ejohannsen@motacorp.com	419-707-0617
Mick Papp	MOTA	mpapp@motacorp.com	
Robert Anderson	Consulting	banders@mindspring.com	803-648-2177
John Tauxe	Nepture	jtauxe@neptuneiuc.org	ext 15 505-662-0707
Julien Boyance	Northwind	jboyance@northwind-inc.com	505-661-4290
Pete Maggiore	Northwind	pmaggiore@northwind-inc.com	505-661-4290
Jim Ferguson	Northwind	jferguson@northwind-inc.com	505-661-4290
Chuck Negin	PEC	cnegin@pec1.net	724-858-6228
Sam Martin	SAMI LLC	smartin@samive.com	303-674-6900

12:45pm Q&A following presentation:

Allan asked if the erosion of the wall was considered for the steep part of the canyon. Rich answered this was considered - alternatives included items such as to use nails. John wanted to know what kinds of rocks were being considered: Rich answered New Mexico or Colorado rock and the figures are in the report. Bruce asked about how the number of wells was derived. Rich answered every 50 feet for number of wells. Lack of water is an issue regarding slope here in New Mexico. Ron added that concrete wall around the waste perimeter, is an accounting available for the contamination in the soil moved away from disposal pits and shafts? John mentioned bio-layer, does it keep ants out - depth, studies show that ants can go down over 4 meters. Bob mentioned that the PMP (Probable Maximum Precipitation) figures used were for 100 yrs.

Debriefing back at MOTA offices:
Sam described to the team that he needed all their proposals with their attachments, backup, estimates, reference documents, spreadsheets, drawings, summaries, PADDIs, all materials so that the report can be completed for timely submittal. Team to review draft for their approval tonight. Report projected to be ready for client Tuesday, September 4th, 2007.