WASTE PIT 6 EXPOSED MATERIAL REMOVAL ALTERNATIVE EVALUATION

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WASTE PIT 6 EXPOSED MATERIAL

REMOVAL ALTERNATIVE EVALUATION

Introduction

This report documents an evaluation of alternative methods to mitigate the release from the exposed material in Waste Pit 6, and recommends a preferred method for completion of the removal action. The evaluation was completed as directed in the DOE-2014-90 Removal Action Memorandum: "Waste Pit 6 Exposed Material," from G. W. Westerbeck to W. H. Britton, dated October 3, 1990.

Current Situation

Waste Pit 6 contains an estimated 9,000 cubic yards of green salt, slag, process residues, and asbestos. The 32,400 square foot surface area is covered with up to two feet of water with the exception of 4,800 square feet of material.

The exposed material is available for wind erosion and dispersal resulting in a significant contribution (88 percent) to the calculated offsite radiation exposure received by the offsite population. Based on the RSE, "Waste Pit 6 Exposed Material," a removal action is recommended to mitigate the release caused by the exposed material.

Alternatives Considered

Several alternatives were identified as candidates to mitigate the release from Waste Pit 6. The alternatives are:

1. No action
2. Tarp
3. Remove and containerize
4. Distribute material below water level
5. Spray on protective cover
6. Increase and maintain higher water level

Evaluation Criteria

Three general criteria are evaluated in the report: effectiveness, implementability, and cost. The effectiveness criteria was broken down into four components.

1) Environmental

The effectiveness of the alternative was measured with respect to releases anticipated after the completion of the action, releases expected during the removal action, and the appearance of the pit after the completion of the action.

2) Mobility Reduction

Each alternative was graded according to its effect on the variables in the numerical models used to calculate releases.

3) Consistency with Final Action

The alternative was graded as to whether or not it increased the volume of waste or altered the consistency of the waste material.

4) Maintainability

Maintenance items such as reapplication, inspections, and adjustments of water cover level were evaluated.

The implementability criteria was broken down into three components.

1) Constructibility

An outline of the major actions was prepared and the actions were looked at with respect to complexity of construction/engineering and the amount of equipment required.

2) Occupational Hazards

Each alternative was evaluated on the amount of direct material handling and the anticipated level of protective clothing, respiratory protections, and external dose estimates.

3) Timeliness

The alternative was graded on the anticipated time to engineer the action, prepare required documentation, perform training, and complete implementation.

The cost criteria was broken down into construction/implementation of removal action and maintenance activities.

Description of Alternatives

1. No Action

The present conditions will not be altered. Continued releases will occur, with the magnitude dependant on the weather conditions, since the surface area will be unaffected. There will be no effect on the final remedial action. No construction costs would be incurred, but the pit must be inspected and at least one water level adjustment is anticipated each year at a cost of $2.5K.

2. Tarp

A Herculite tarp would be placed over the exposed material.

The action would not result in any release during the work since there will be no movement of waste. For the purposes of modeling, the exposed surface area would be zero (0), eliminating any future releases. The mounded material will remain visible to passerbys. The action will add about 80 cubic feet of waste material to the pit and require a minimal amount of additional material handling at final remediation. The cover would, most likely, require replacement prior to final remedial action.

The construction would require workers to be on the mounded material receiving an estimated dose of 400 man-mRems. The most complex aspect of tarp placement would be the method used to anchor the tarp. Preparation, review, and approval of the necessary documents would require about 60 working days with an additional 12 working days for training and implementation.

Installation costs for engineering, procurement, and installation would be about $70K. Annual maintenance cost would be about $10K.

3. Remove and Containerize

An estimated 180 cubic yards (2 percent of Waste Pit 6 volume) of material would be mechanically dug out and placed in drums, and would have no significant impact on the final remedial action. No exposed material would be left; therefore, continued releases will cease. The material would be watered during removal in order to minimize fugitive emissions during excavation and to assure that respiratory protection would not be necessary.

Based upon the available sample and analysis data in the CIS, the removed material would require management as hazardous waste. Labeling, sampling, storage, and inspection of more than 600 drums of material would be required. Containerizing the material would have the benefit of being easily retrievable.

The general scheme for the alternative is to barricade an area off and scoop out the material with a backhoe and load into a drum via a funnel device. Water would be sprayed over the dig area to minimize fugitive dust. There will be no specialized handling equipment and no need for containments other than a drip tray for spillage; however, the bucket will have to be fitted with a sleeve, and additional training must be completed to prevent breaching the liner.

Although there will be no direct handling of the material, some manual operations such as lidding the drums are involved. The drummed material will have about a 10 mr/hr contact dose rate resulting in 550 man-mRems for the task.

The planning period would be about 80 working days, with implementation taking an additional 18 working days.

Implementation costs would be about $185K including personnel, procurement of drums and sampling analysis for one out of every 20 drums. For the evaluation, it is assumed that 650 drums would be classified as RCRA, resulting in a per-drum cost of $400/year, based on the current costs to store 6,000 drums.

4. Distribute Material Below Water Line

The exposed material will be evenly distributed below the present water level by the use of a boom grader or a crane with a clamshell attachment. To prevent tearing the pit liner, the clamshell will be fitted with a sleeve, and the operators will be given additional training on the pit construction and the position of the exposed material.

Continued environmental releases, via fugitive dust emissions, will be eliminated due to an uninterrupted water surface. Releases during the material movement would be eliminated by a water spray saturating the material during the movement. No impact on final remediation is anticipated. The maintenance of the water cover would require one level adjustment per year.

Fifty days of planning and 14 days of implementation are estimated to be required. The necessary equipment and operating personnel are onsite and could be activated with a minimal amount of task specific training. The occupational hazards are minimal; respiratory protection may not be required, and there will be no direct handling of material.

Startup costs for planning, documentation, training, material, and implementation are about $74K with $2.5K annual maintenance costs.

5. Spray on Protective Cover

A spray-on surface binding material is applied to the exposed material. As long as the surfactant remains intact, all contaminants are entrapped; therefore, the effectiveness is measured in reference to the products durability. The most effective compounds will last approximately 10 to 12 months and reapplication is required at that time. No releases are expected during applications since the material would not be disturbed. A 1/4" layer of stabilizer would add 100 cubic feet or 13 drum equivalents of material to the pit for each application. One water level adjustment is anticipated each year, and inspections would be required. The mounded material will be visible to passerbys.

Implementation is simple: an air sprayer is used with an extended application wand could be used. The area would be covered in less than one day. The implementation could be complete in about 40 days.

Implementation would be approximately $47K, and annual maintenance costs would be $7K per year.

6. Increase and Maintain a Higher Water Level

The water level will be raised one foot and maintained between 582 and 583 foot elevation. Any further increase would result in the possibility of overflowing the pit due to the seasonal variances in water level.

One-thousand square feet of material would remain exposed, resulting in an 80 percent reduction in the release. To maintain the desired water cover, four level adjustments are estimated to be needed each year. There would be no anticipated impact on final remediation.

The additional level adjustment results in an increased likelihood of spills as a result of moving more liquid. The occupational hazards would be limited due to disturbance of the waste material.

Implementation could be completed in about 64 working days. The majority of the planning time is for the preparation and review of the NEPA documentation and a Standard Operation Procedure (SOP).

Planning costs consisting of personnel, training, and materials would be about $45K with annual maintenance costs around $9K.

Summary

In addition to the removal action, the standard operating procedure for pit maintenance requires revision and the air monitoring capabilities in the waste pit area need to be upgraded.

Attachment A summarizes rankings for each alternative.

The timeliness rankings criteria is:

5 requires less than 50 days
4 requires less than 70 days
3 requires less than 90 days
2 requires less than 110 days
1 requires more than 110 days

Cost ranks criteria is:

L requires less than 25K
M is more than 25K and less than 100K
H requires more than 100K

The remaining criteria rankings are: five for best satisfying the criteria and one for least satisfying the criteria.

Attachment B contains a projected schedule for the implementation of Alternative 4.

Recommendations

The recommended action is Alternative 4, "Distribute Material Below the Present Water level." The action eliminates the continuing release and is implemented both quickly and cost effectively, with minimal occupational hazards. The action will not introduce any new hazards or precautions during the completion of final remedial action.

WASTE PIT 6 ALTERNATIVES

		ALT 1 No Action	ALT 2 Protective Cover	ALT 3 Remove & Containerize	ALT 4 Distribute Below Water	ALT 5 Chemical Stabilization	ALT 6 Increase Water Level
EFFECTIVENESS	Environmental	1	4	5	5	4	2
	Mobility Reduction	1	4	5	5	4	2
	Consistency with Final Action	5	4	5	5	4	5
	Maintainability	5	4	3	5	4	2
IMPLEMENT	Constructability	5	4	3	4	5	5
	Occupational Hazards	5	3	2	4	5	5
	Timeliness	5	4	3	4	4	4
COST	Construction	L	M	H	M	M	M
	Maintenence	L	L	H	L	L	M
TOTAL		27	27	26	32	30	25

RANKING
1- LEAST SATISFIES
5- BEST SATISFIES

COST
L < $25K
M < $100K
H > $100K

ATTACHMENT A

1036