



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

IN REPLY
REFER TO:
3046 (660)

To: Chief, Hazardous Materials and Program Management Staff
From: Chief, Division of Solid Mineral Operations *JJK/Smh 9/24/15*
Subject: Cost Estimate for Reclamation at the Atlas Asbestos Site

Pursuant to your request the Division of Solid Mineral Operations (660) has prepared a generalized cost estimate for the reclamation of asbestos laden ground at the Atlas Asbestos mine/mill site located near Coalinga, California. The standards you requested to be used for this cost estimate are the Environmental Protection Agency rules for "Inactive Waste Disposal Sites for Asbestos Mills and Manufacturing and Fabrication Operations" codified at 40 CFR 61.153.

In order for 660 to perform this estimate, assumptions were employed to cover a lack of any detailed information concerning the site, topographic maps and the short turnaround time to develop the cost estimate. The following assumptions were used:

- + The site is approximately 16 acres in size containing a closed mine, millsite and accompanying waste dumps.
- + Local rainfall is less than 10 inches per year.
- + Top soil material is not available at the site and will have to be purchased from a presumed supplier located 100 miles from the site.
- + All ground surfaces containing asbestos are to be covered with material specified in 40 CFR 61.153(a)(2), (a)(3), or (a)(4) and (b).
- + EPA 40 CFR 61.153 standards call for the following actions to be carried out to suppress asbestos dust: (a)(2) - 6 inches of compacted cover that is vegetated; (a)(3) - 24 inches of compacted cover that is maintained; (a)(4) - application of a resinous or petroleum-based dust suppression agent; and (b) - installation of warning signs and fencing. There is a basic soil mechanics problem with compacted cover material; it will not support vegetation. It would be like trying to grow grass on a dirt road; root penetration would be difficult at best and water infiltration would be impossible.

Even the placement of top soil on the compacted material would be structurally weak. Roots would not penetrate the compacted layer below thereby offering little structural bond that would help preclude soil erosion. For purposes of this cost estimate the soil layer thicknesses required by the EPA standard will be used, but compaction will not be employed.

- + Top soil is assumed to compact 25 percent due to mechanical handling therefore 6 inches of finished soil will require 8 inches of material, and 24 inches will require 32 inches of material.
- + Top soil will be purchased for \$30 per cubic yard from a site that is located 100 miles from the Atlas Asbestos site.
- + Top soil will be hauled to the site using 30 ton rear-dump highway trucks.
- + Site topography will be shaped using tractors, graders, scrapers, and if necessary, front-end loaders and trucks. All waste dump slopes will be reduced to a final slope of 3:1 and any slopes higher than 50 feet will have an intermediate terrace.
- + Appropriate seed, nutrient, water and mulch will be employed to stabilize the surface area.
- + Half of the Atlas asbestos site (8 acres) will require cover material and the top one foot of this acreage will require preparation. This assumption is made to account for areas that do not require preparation balanced by those areas needing extensive (slope work or land forming) preparation.
- + All personnel working at the site will be required to wear respirators and protective clothing. A worker change house with showers and clean change room will be provided at the periphery of the site to provide for personnel decontamination (29 CFR 1910.1001). All highway trucks will be washed with water prior to leaving the site. All mechanical equipment will contain sealed cabs to protect operators from asbestos dust. All haul roads at the site will be sprayed with water as a dust suppression agent. The Project will be performed during the cool time of the year. ~~Personnel wearing respirators have a tendency to remove the respirators when they perspire. Dust suppression will be easier to maintain due to lower evaporation of water during the cool time of the year.~~

Cost Estimate for Hauling Top Soil to Atlas Asbestos Site

Top Soil - Top soil will be purchased for \$30 per cubic yard at a location approximately of 100 miles from the Site.

Truck Ownership - Assume that 30 ton rear dump highway trucks will be used to haul top soil to the site. The trucks will be purchased for about \$100,000 and financed for 5 years at 12 Percent interest.

Assume the contractor will include all of the purchase price and financing costs in the hourly charge for the truck, and that the trucks will work 2,080 hours per year for cost purposes. This will result in a cost of \$13.30 per hour.

Fuel - Average fuel efficiency of a 30 ton highway haul truck is about 5 miles per gallon. Assuming diesel fuel costs an average of \$1.35 per gallon, and the trucks travel an average 55 miles per hour, the fuel cost would be \$14.85 per hour.

Maintenance - Truck maintenance will include tires, lubrication, filters, oil changes and general preventive maintenance that costs about \$6,000 per year or about \$2.83 per hour. Engines will need overhaul during the 5 year life but will not be factored into this project due to the short duration of the job.

Taxes and Insurance - Trucks of this type pay about \$3,500 per year in highway use taxes and about \$4,500 for insurance coverage. However in California, due to the high density of produce haulers and high frequency of accidents insurance costs will be about \$5,500 per year. Total cost for taxes and insurance will be about \$9,000 or about \$4.33 per hour.

Operator - Truck drivers are payed an average of \$12.00 per hour

Overhead - Overhead cost typically include management, office personnel, equipment, and building, electrical, phones, heat and air conditioning, workmans compensation, unemployment and health insurance, safety and other associated costs. This cost would normally be about 30-35 percent of labor costs, however, unusual costs will be incurred for health and safety due to asbestos. Therefore the total cost is estimate to be 45 percent of labor, or a cost of \$5.40 per hour. This cost could be a lot higher, therefore, additional cost increases will be added in other parts of this estimate, in order to attempt to cover this expense.

Profit - The contractor will probably build in a profit charge that will be hidden in all other costs. This will increase the cost by about 10 percent or about \$5.27 per hour.

Composite Truck Haulage cost per hour

<u>Cost Center</u>	<u>Cost per Hour</u>
Ownership	\$13.30
Fuel	\$14.85
Maintenance	\$ 2.83
Taxes/insurance	\$ 4.33
Operator	\$12.00
Profit	\$ 5.27
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Total	\$58.00 (rounded)
	52.58
	53.00

Cost of Top Soil Delivered to Site

Assume top soil borrow area is 100 highway miles from site, and haul trucks will average 55 miles per hour loaded or empty. Round trip will be 200 miles.

Top Soil - 20 cu.yd./truck x \$30 per cubic yard = \$600.00

Travel time - 200 miles / 55 miles per hour = 3.64 hours

Travel time cost - 3.64 hours x \$58.00 per hour = ~~\$211.12~~^{191.39}

Top soil load/dump time - Truck drivers will look for unscheduled break time whenever possible, therefore add 0.5 hours to both loading and dumping time for a total of 1.0 hour or \$58.00

Truck decontamination - Top soil haul trucks will be washed with water prior to leaving the site to prevent asbestos laden dust from leaving the site. It is estimated this will take about 0.5 hours for a cost of \$29.00

Composite cost for top soil

<u>Cost Center</u>	<u>Cost</u>
Top soil	\$600.00
Travel Time	\$211.12
Load/dump	\$ 58.00
Truck wash	\$ 29.00
	<hr/>
	880.00
	\$900.00 (rounded)
\$45 per cubic yard	44
\$4.50 per truck-mile	4
\$0.225 per cubic yard-mile	.22

Cost for Handling Top Soil, Site Preparation and Revegetation

It is assumed that all mine and mill waste pile slopes will be reduced to a slope of 3:1, and that all surface areas containing asbestos will be covered with top soil in accordance with the appropriate regulations and revegetation. This effort will require the use of tractors, graders, front-end loaders, trucks and other appropriate equipment. The average cost for all elements of earth moving is about \$2/cu.yd.. This is a conservative estimate without benefit of a detailed reclamation plan for the site.

Modified 40 CFR 61.153 (a)(2) standard: 6 inch top soil cover

8 inches of delivered top soil will result in 6 inches of cover.

Top soil Volume: 8 acres x 43,560 sq.ft./acre x 0.67 ft. cover/27 cu.ft./cu.yd. = 8,647 cu. yds

Cost: 8,647 cu.yds. x \$45/cu.yd. = \$385,051
~~380,168~~

Assume all covered surface will require some mechanical preparation to an average depth of one foot, plus revegetation activities.

8 acres x 43,560 sq. ft./acres x 1 ft. (depth)/27 cu.ft./cu.yd. x \$2/cu.yd. = \$25,813

Subtotal cost: \$410,864
~~406,281~~

Profit: Assume 10 Percent or \$41,086
~~40,628~~

Subtotal Cost: \$452,000 (rounded)
~~447,000~~

2,360 ft. of Perimeter fence (8 ft. chain link): \$28,320

Total Cost: \$480,000 (rounded)
~~476,000~~

Modified 40 CFR 61.153 (a)(3) standard: 24 inches topsoil cover

Total Cost: \$1,870,000 (rounded)

~~1,870,000~~
~~33558 yd³~~

Since the site is contaminated with asbestos, health and safety costs could vary widely. It is questionable insurance can be obtained for personnel working at the site. This could lead to issuing a contract to a company that specializes in hazardous work. This could very well increase the overall cost estimate for this project.

23508		
2907 yd³ x 44 =	128,028	1,476,552
+ 27490		1,553,992
+ 28320 prep =		1,553,992
+ profit		1,709,391
	452,000	
+ 28320 fence =	28,320	1,750,000

40 CFR 61.153 (a)(4) EPA standard: Cover site with petroleum resin spray

This standard allows for a petroleum based resin spray to be applied to the asbestos contaminated ground. For purposes of this estimate two methods are presented for consideration.

The first method calls for applying an asphalt cement mixed with heavy fuel oil that is sprayed directly on the surface. This material will penetrate about 5-10 mm into the ground and have a skin that is about 1 mm thick that will be very sticky. If the sprayed material is left as it is applied, it will be subjected to the ultra violet rays of the sun and eventually degrade, necessitating a reapplication of resin. The sticky surface will also present difficulties to wildlife entering the site. It is suggested that a fine layer of sand be sprayed on the resin as it is being applied to the surface. The sand will protect the resin from the sun and the wildlife from the resin. The estimates cost for this method is about \$120,000, without perimeter fencing.

Fencing would cost an additional \$28,320 for a total estimated cost of \$150,000. This method will remain viable for about 5-7 years necessitating reapplication of resin periodically in the future.

The second method calls for mixing an asphalt emulsion base mix (AEBM) into the top 4-6 inches of ground surface, rolling it down, and spraying slow setting (SS) asphalt emulsion on horizontal surfaces and rapid setting asphalt emulsion on slope surfaces, followed by perimeter fencing. This method will cost approximately \$ 275,000 without fence. Fencing would cost an additional \$28,320 for a total cost of \$300,000 (rounded).

If you have questions concerning this estimate or are in need of further information please contact Fred Kerulis at 343-7722.