



UNION CARBIDE CORPORATION
METALS DIVISION

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TECHNOLOGY DEPARTMENT
— ENGINEERING

May 27, 1981

Mr. Albert J. Hazle, Director
Radiation and Hazardous Wastes Control Division
Colorado Department of Health
4210 East 11th Avenue
Denver, Colorado 80220

Subject: Plans for Reclamation - For Surety Purposes
Radioactive Materials License No. Colo. SUA-673

Dear Mr. Hazle:

In your letter to Mr. R. G. Beverly dated May 14, 1981, you requested Union Carbide Corporation's revisions to its May 30, 1980 submission.

On March 25, 1981, a report titled "Uravan Tailings Reclamation Report - March 1981" prepared by International Engineering, Inc. (IECO) was submitted to the CDH and NRC. An additional study on ponds reclamation is being completed by IECO and will be submitted when it is received. Revisions of the May 30, 1980 submission are based on the recommendations in these reports.

Attached are five (5) copies of "Proposed Plans and Estimated Costs for Tailings Reclamation, Mill Decommissioning and Pond Reclamation at the Uravan Mill - for Surety Purposes," Revision 1, dated May 27, 1981. This presents for surety purposes, UCC's plans and estimated costs for reclamation of the existing ponds, commingled tailings piles and for decommissioning of the Uravan Mill.

Very truly yours,

T. J. Kagetsu

T. J. Kagetsu
Assistant Director-Engineering

TJK/cep
Enc.

cc: Messrs.

- Mr. Ken Waesche
- Mr. Steve Spann
- Mr. Richard S. Dressel
- Mr. Robert Shukle
- Dr. Gonzalo Castro

- Mr. Charles Roberts
- ~~Dr. Roy Person~~
- Mr. Rahe Junge
- Mr. Jay Lucas
- Mr. John R. Giedt

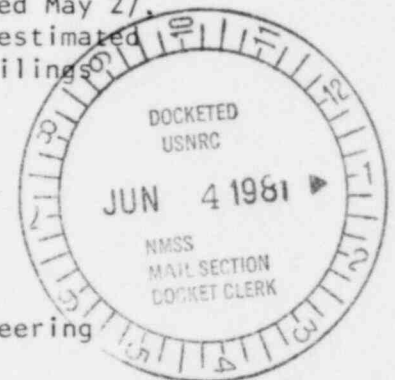
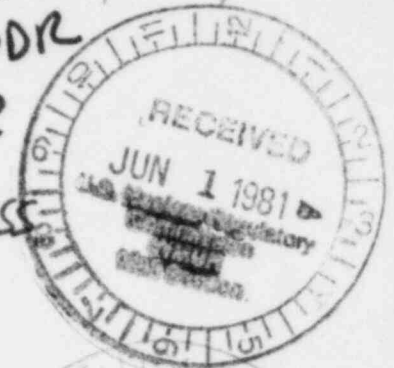
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D. Cramer

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Proposed Plans and Estimated Costs for
Tailings Reclamation, Mill Decommissioning
and Pond Reclamation at the
Uravan Mill - for Surety Purposes

Revision 1
May 27, 1981

1.0 Introduction

The Colorado Department of Health (CDH) and Union Carbide Corporation (UCC) have been working towards a financial surety agreement for reclamation. On May 30, 1980, Union Carbide submitted a document titled "Proposed Plans and Estimated Costs for Tailings Reclamation, Mill Decommissioning and Pond Reclamation at the Uravan Mill - for Surety Purposes."

On July 9, 1980, a meeting was held with personnel representing CDH, NRC, GEI, BLM, UCC, and UCC consultants. It was stated by the NRC and CDH that in order for the tailings reclamation plan submitted on May 30, 1980 to be considered, additional field data and studies were required.

In August 1980, UCC selected International Engineering Company, Inc. (IECO) to study alternatives for the reclamation of the existing tailings piles. In conjunction with this study, IECO conducted field investigations and evaluated site specific geotechnical data, ground water impact, long-term stability, and cover materials to control radon emanations and to provide long-term erosion protection. IECO's "Uravan Tailings Reclamation Report - March 1981" was submitted to the CDH and NRC on March 25, 1981.

IECO is also preparing a report on ponds reclamation in which the evaluations are based on available data. This report will be submitted when completed.

This document presents for surety purposes UCC's plans and estimated costs for reclamation of the existing ponds and commingled tailings piles based on IECO's recommendations in the above reports and for the decommissioning of the Uravan Mill.

2.0 Summary

This document presents a plan and estimated costs for surety purpose for reclamation of the Atkinson Creek area, Club Ranch ponds, River ponds, Club Mesa spray area, mill decommissioning, and reclamation of the existing commingled tailings piles. The estimated cost for these activities is \$17,710,000 in 1981 dollars. A summary of the costs is shown in Table I.

TABLE I

SUMMARY OF RECLAMATION COSTS FOR SURETY PURPOSES

<u>Item</u>	<u>Total Cost</u> <u>M\$</u>
Atkinson Creek Area	561
Club Ranch Ponds	2,825
River Ponds	1,573
Club Mesa Spray Area	2,041
Mill Decommissioning	3,025
Tailings Pile 2	5,103
Tailings Pile 3	<u>2,582</u>
TOTAL COST	17,710

The contaminated material in the Atkinson Creek area will be reclaimed in place. The contaminated material from Club Ranch ponds 2, 3 and 5 will be excavated, transported to, and be placed on top of the existing tailings ponds. Club Ranch ponds 1, 4 and 6 will be reclaimed in place. The contaminated material from the River ponds will be excavated, transported to, and be placed on top of the existing tailings ponds. The Club Mesa spray area will be reclaimed in place. The River ponds settled solids in the Club Mesa area will be moved and be placed on top of the existing tailings.

The mill decommissioning will provide for the removal of all structures and process area cleanup. All contaminated materials will be placed on top of the existing tailings piles.

The tailings piles with the above contaminated materials will be reclaimed in place at a nominal 3 horizontal to 1 vertical slope on the sides and a minimum 3 percent slope on top.

3.0 Reclamation of the Ponds

3.1 Atkinson Creek Area

The Atkinson Creek area will be covered with 1 foot of compacted clay, 1 foot of random fill, and 1 foot of rock cover. Additional rock will be placed on the slopes.

3.2 Club Ranch Ponds

The contaminated material from Club Ranch ponds 2, 3 and 5 will be excavated, transported to, and be placed on top of the existing tailings ponds. Club Ranch ponds 1, 4 and 6 will be graded. Four feet of riprap will be placed over this area below the PMF level. Ponds 1, 4 and 6 will be covered with 1 foot of compacted clay, 1 foot of random fill, and 1 foot of rock cover above the PMF level.

3.3 River Ponds

The contaminated material from the River ponds will be excavated, transported to, and be placed on top of the existing tailings ponds. This area will be graded, covered with 1 foot of overburden, and revegetated.

3.4 Club Mesa Spray Area

The Club Mesa spray area will be reclaimed in place. This area will be graded and low levels will be filled. The area will then be covered with 1 foot of compacted clay, 1 foot of random fill, and 1 foot of rock cover.

The River ponds settled solids located on Club Mesa will be excavated, transported to, and be placed on top of the existing tailings.

4.0 Decommissioning the Mill

1. All equipment including instrumentation, process piping, electrical controls and switchgear, and structures will be removed. Concrete foundations will be demolished and removed as required. Salvageable items will be decontaminated and removed from the site. The remaining items will be placed on the tailings piles prior to reclamation.
2. The process area will be cleaned up and all contaminated materials will be placed on the tailings piles prior to reclamation. This area will be backfilled and graded.

5.0 Reclamation of the Existing Commingled Tailings Piles

The reclamation plan of the existing commingled tailings piles is based on Scheme A which was recommended by IECO in their "Uravan Tailings Reclamation Report" dated March 1981. The contaminated material from Club ponds 2, 3, 5, River ponds, and from decommissioning the mill, will be placed on top of the existing tailings prior to reclamation.

1. Tailings piles 1, 2 and 3 will be reclaimed in place with side slopes nominally at 3 horizontal to 1 vertical, and a minimum 3 percent slope on top.
2. The protective cover on the slopes will consist of 1 meter compacted clay, 0.7 meter of random fill, and 1.3 meters of rock borrow, for a total protective cover of 3 meters.
3. The protective cover on top will consist of 1 meter compacted clay, 1.4 meters random fill, and 0.6 meter of rock borrow, for a total protective cover of 3 meters.

6.0 Cost Estimates

The costs are given in 1981 dollars. The cost estimates for the reclamation of ponds are given in Table II, for mill decommissioning in Table III, and for the reclamation of the existing commingled tailings in Table IV.

TABLE 11

COST ESTIMATE FOR RECLAMATION OF PONDS
(Costs in 1981 Dollars)

Area	Item No.	Description of Work	Quantity	Unit Costs (\$/Unit)	Estimated Costs (M\$)
Atkinson Creek	1	Reslope sides of pile to 5:1 slope	60M yd ³	2.50	150
	2	Excavate, load, haul, place and compact clay cover	20M yd ³	2.85	57
	3	Excavate, load, haul, and place fill for cover	20M yd ³	2.85	57
	4	Excavate, load, haul, and place rock for cover	33M yd ³	9.00	297
		Total for Atkinson Creek Area			
Club Ranch Ponds	1	Excavate, load, haul, and place contaminated materials from Ponds 2, 3 and 5 on top of existing tailings and grade ponds 1, 4 and 6	300M yd ³	5.00	1,500
	2	Excavate, load, haul, and place riprap up to PMF level	90M yd ³	9.00	810
	3	Excavate, load, haul, place, and compact clay cover for Ponds 1, 4, 6 above PMF level	35M yd ³	2.85	100
	4	Excavate, load, haul, and place fill for cover for Ponds 1, 4, 6 above PMF level	35M yd ³	2.85	100
	5	Excavate, load, haul, and place riprap for cover for Ponds 1, 4, 6 above PMF level	35M yd ³	9.00	315
		Total for Club Ranch Ponds			
River Ponds	1	Excavate, load, haul, and place contaminated materials on top of existing tailings and grade	200M yd ³	7.50	1,500
	2	Excavate, load, haul, and place fill for cover	18.5M yd ³	2.85	53
	3	Vegetate	10 ac	2,000	20
	Total for River Ponds				1,573
Club Mesa	1	Excavate, load, haul, and place fill	100M yd ³	2.85	285
	2	Scrape outer areas and grade reclamation area			225
	3	Excavate, load, haul, place, and compact clay cover	75M yd ³	2.85	214
	4	Excavate, load, haul, and place fill for cover	75M yd ³	2.85	214
	5	Excavate, load, haul, and place rock for cover	75M yd ³	9.00	675
	6	Excavate, load, haul and place contaminated material from River Ponds on top of existing tailings and grade	150M yd ³	2.85	428
	Total for Club Mesa Spray Area				2,041

TABLE III

COST ESTIMATE FOR DECOMMISSIONING THE URAVAN MILL
(Costs in 1981 Dollars)

<u>Item No.</u>	<u>Description of Work</u>	<u>Estimated Cost (M\$)</u>
1	Removal of equipment, including piping, instrumentation, electrical controls and switchgear and hauling contaminated materials to the top of the existing tailing piles	1,820
2	Demolition of structures including buildings, storage bins, steel structures, and miscellaneous support facilities	420
3	Break up and remove concrete	675
4	Excavate contaminated process areas, haul contaminated materials to the top of the existing tailings piles, backfill, and regrade	110
	Total for Mill Decommissioning	<hr/> 3,025

TABLE IV

COST ESTIMATE FOR RECLAMATION OF EXISTING TAILINGS
(Costs in 1981 Dollars)

Area	Item No.	Description of Work	Quantity	Unit Costs (\$/Unit)	Estimated Costs (M\$)
Existing Tailings Pile 2	1	Grade slope and top			50
	2	Excavate, load, haul, place, and compact clay cover	360M yd ³	2.85	1,026
	3	Excavate, load, haul, and place fill for cover	355M yd ³	2.85	1,012
	4	Excavate, load, haul, and place rock for cover	335M yd ³	9.00	<u>3,015</u>
			Total for Reclamation of Tailings Pile 2		
Existing Tailings Pile 3	1	Grade slope and top			30
	2	Excavate, load, haul, place, and compact clay cover	180M yd ³	2.85	513
	3	Excavate, load, haul, and place fill for cover	210M yd ³	2.85	599
	4	Excavate, load, haul, and place rock for cover	160M yd ³	9.00	<u>1,440</u>
			Total for Reclamation of Tailings Pile 3		