

ALTERNATIVE 1

No Action (Continued Groundwater Containment and Removal)

Site: HMC Grants Reclamation Project
Location: Grants, NM

Phase: ACL Application
Date: 4/4/22

Base Year:
Duration: 1,003 years

Description: Alternative 1 assumes denial for amendment of existing groundwater corrective action plan and continued operation of the existing groundwater containment and removal systems essentially in perpetuity, due to the long-term sources of groundwater impact. Therefore, this alternative has been modeled for the compliance period of 1,000 years using existing capital equipment and infrastructure design. Groundwater pumping to mitigate the groundwater plume down gradient of the LTP/STP area would be performed for 150 years, after which is assumed (based on groundwater model simulations) that low concentration off-site waters have been mitigated and zeolite is no longer appropriate for treatment of higher concentration on-site groundwater and the groundwater plumes have been limited to the immediate area around the LTP/STP. It is also assumed that water treatment rates would decrease to a long-term steady state rate (600 gpm) for the remainder of the compliance period to contain the long-term groundwater sources to the immediate LTP/STP area. All capital equipment (e.g., wells, treatment systems, etc.) are assumed to have a 50 year life except for spray evaporators which have a 10 years capital life due to the high salinity environment on the evaporation ponds. Groundwater monitoring and routine Site facilities operation and staffing continue throughout the compliance period. All subsequent reclamation costs are assumed to be incurred in years 1,001 through 1,003. The groundwater wells, piping infrastructure, and other above-ground groundwater treatment systems (RO, evaporation ponds) would continue to operate for the full compliance period (1,000 years) and are all assumed to have 50 year capital lives, after which replacement of the capital equipment is necessary. Perpetual treatment under this alternative precludes license termination, Site transfer to DOE, and de-listing from the National Priorities List (NPL).

Capital Costs:

The zeolite water treatment system would be relocated from the top of the Large Tailings Pile to an area of approximately 4 acres just south of the existing reverse osmosis treatment plant in year 0. Re-lining of Evaporation Pond 1 (EP1) would be planned for year 0. Installation of the LTP engineered final cover (part of groundwater source control efforts) would occur in year 1 after the zeolite system is relocated. The LTP Construction Completion Report (CCR) would be provided to NRC in year 152. Covering of the STP, which is not considered a substantial long-term source of groundwater impacts, is not included as a groundwater CAP alternatives cost. After 150 years of pumping, it is assumed that groundwater recovery rates would be based on long-term containment pumping rates (from groundwater model alternatives analyses), and would continue to use only RO treatment (600 gpm), evaporation and spray evaporation (100%), and compliant water re-injection into the aquifer. Long-term management of water recovered from the LTP toe drain system and groundwater recovery system would be managed/treated in the RO system and existing evaporation ponds for the full 1,000 years.

Decommissioning of the RO, zeolite, and evaporation pond treatment systems, and site wide piping infrastructure would be completed in Year 1,001. Corrective Action wells and removal of site wide piping infrastructure would be abandoned per License and State requirements in years 1,001 and 1,002. The Corrective Action CCR would be submitted to NRC in year 1,003.

Operating and Maintenance Costs (O&M):

Ongoing O&M costs include operation of groundwater recovery and injection wells and above ground infrastructure (years 0-1,000), operation of the RO treatment and zeolite system at a nominal rate of approximately 600 gpm, operation of the zeolite treatment system at a nominal rate of 600 gpm (years 0-150), operation of the spray evaporation systems (100%) on the evaporation ponds (years 0-1000) After 150 years of pumping, treatment rates would be reduced to manage the reduced flow rates associated with groundwater containment. This includes operation of the RO treatment system at a nominal rate of approximately 600 gpm (years 151-1,000) and operation of the spray evaporation systems (100%). Groundwater monitoring costs for the existing groundwater monitoring program (years 0-1,000), and operation of the Site support facilities (years 0-1,000; admin, environmental, maintenance, sampling and staff, etc.) would be performed throughout the entire compliance period.

Periodic Costs:

The LTP Cover is placed in year 1 and the LTP Cover CCR is developed in year 2. Capital equipment for the groundwater monitoring and water treatment systems are replaced every 50 years after initial installation, including EP1 (initial re-lining in year 0, first periodic re-lining in year 50), Evaporation Pond 2 (EP2; first re-lining in year 5), Evaporation Pond 3 (EP3; first re-lining in year 20), while spray evaporators, which are subject to high salinity conditions, are replaced every 10 years starting in year 10. The monitoring well network is first replaced in year 20 and every 50 years thereafter, the RO plant is first replaced in year 45 and every 50 years thereafter. Capital replacement of the zeolite system would parallel that of the reverse osmosis treatment system in timing and frequency.

Present value is calculated based on a discounted cashflow factor using the equation $[(1+i)^n]/[(1+r)^n]$ where i is the annual inflation rate, r is the annual discount rate and n is the annual compounding period (See Sheet 13).

CAPITAL COSTS:

Item No.	DESCRIPTION & NOTES	UNIT	UNIT COST	QUANTITY	TOTAL (ROUNDED)
1.00	EP1 Re-lining (Year 0)		\$7,865,000		\$7,865,000
1.01	EP1 Re-lining	LS	\$6,500,000	1	\$6,500,000
1.02	Project Management	%	\$650,000	10	\$650,000
1.03	Contingency	%	\$715,000	10	\$715,000
2.00	Zeolite Relocation (Year 0)		\$4,326,310		\$4,324,210
2.01	Existing Zeolite Decommissioning	LS	\$191,000	1	\$191,000
2.02	Zeolite Relocation	LS	\$3,720,250	1	\$3,720,250
2.03	Project Management	%	\$39,120	10	\$37,210
2.04	Contingency	%	\$375,940	10	\$375,750
3.00	TOTAL CAPITAL COST				\$12,189,210

O&M COSTS:

4.00	Groundwater Containment and Removal System O&M (Years 0-1000)		\$421,580		\$421,996,580
4.01	Groundwater Extraction & Injection System O&M	year	\$365,000	1001	\$365,365,000
4.02	Project Management	%	\$18,250	5	\$18,268,250
4.03	Contingency	%	\$38,330	10	\$38,363,330
5.00	Groundwater Containment and Removal System O&M (Years 0-1000)		\$2,095,170		\$2,097,265,170
5.01	RO Treatment System O&M up to 600 GPM	year	\$1,814,000	1001	\$1,815,814,000
5.02	Project Management	%	\$90,700	5	\$90,790,700
5.03	Contingency	%	\$190,470	10	\$190,660,470
6.00	Zeolite Treatment System O&M (Years 0-150)		\$702,240		\$106,038,240
6.01	Zeolite Treatment System O&M up to 600 GPM	year	\$608,000	151	\$91,808,000
6.02	Project Management	%	\$30,400	5	\$4,590,400
6.03	Contingency	%	\$63,840	10	\$9,639,840
7.00	Spray Evaporation Treatment System O&M (Years 0-1000)		\$994,460		\$995,449,460
7.01	Spray Evaporation Treatment System O&M (100%)	year	\$861,000	1001	\$861,861,000
7.02	Project Management	%	\$43,050	5	\$43,093,050
7.03	Contingency	%	\$90,410	10	\$90,495,410
8.00	Groundwater Monitoring (Years 0-1,000)		\$169,084	1,001	\$169,253,084
8.01	Sampling Monitoring Wells	EA	\$500	101	\$50,500
8.02	Groundwater Analytical	EA	\$414	101	\$41,814
8.03	Evaluation and Reporting	LS	\$50,000	1	\$50,000
8.03	Project Management	%	\$4,080	8	\$11,390
8.04	Contingency	%	\$5,500	10	\$15,380
9.00	Facility Annual Operation (Years 0-1,000)		\$3,550,000		\$3,553,550,000
9.01	Site Staffing and Management (GW System Active)	year	\$750,000	1,001	\$750,750,000
9.02	Hydrology & Geochemical Consultants	year	\$100,000	1,001	\$100,100,000
9.03	RO Consulting Support	year	\$100,000	1,001	\$100,100,000
9.04	Electrical Maintenance Support	year	\$500,000	1,001	\$500,500,000
9.05	General Equipment Operation and Maintenance	year	\$150,000	1,001	\$150,150,000
9.06	Radiation Safety	year	\$500,000	1,001	\$500,500,000
9.07	Radon/Air Particulate Monitoring	year	\$200,000	1,001	\$200,200,000
9.08	Impoundment Maintenance & Monitoring	year	\$250,000	1,001	\$250,250,000
9.09	Regulatory Reporting	year	\$500,000	1,001	\$500,500,000
9.10	NRC Fees	year	\$500,000	1,001	\$500,500,000
10.00	TOTAL O&M COSTS (through project closeout)				\$7,343,552,534

PERIODIC COSTS:

11.00	EP2 Re-lining (Year 5, every 50 yrs thereafter)		\$7,865,000		\$157,300,000
11.01	EP2 Re-lining (Year 5, every 50 yrs thereafter)	LS	\$6,500,000	20	\$130,000,000
11.02	Project Management	%	\$650,000	10	\$13,000,000
11.03	Contingency	%	\$715,000	10	\$14,300,000
12.00	Spray Evaporator Capital Replacement (year 10, every 10 years thereafter)		\$242,000		\$23,958,000
12.01	Spray Evaporator Capital Replacement (year 10, every 10 years thereafter)	LS	\$200,000	99	\$19,800,000
12.02	Project Management	%	\$20,000	10	\$1,980,000
12.03	Contingency	%	\$22,000	10	\$2,178,000
13.00	EP3 Re-lining (Year 20, every 50 yrs thereafter)		\$7,865,000		\$157,300,000
13.01	EP3 Re-lining (Year 5, every 50 yrs thereafter)	LS	\$6,500,000	20	\$130,000,000
13.01	Project Management	%	\$650,000	10	\$13,000,000
13.02	Contingency	%	\$715,000	10	\$14,300,000
14.00	Monitoring Well Capital Replacement (year 20, every 50 years thereafter)			20	\$19,822,800
14.01	Install/Develop/Sample Monitoring Wells - Alluvial	EA	\$7,900	91	\$718,110
14.02	Install/Develop/Sample Monitoring Wells - U. Chinle	EA	\$9,100	5	\$45,955
14.03	Install/Develop/Sample Monitoring Wells - M. Chinle	EA	\$10,300	3	\$26,008
14.04	Install/Develop/Sample Monitoring Wells - L. Chinle	EA	\$11,500	3	\$29,038
14.05	Project Management	%		10	\$81,920
14.06	Contingency	%		10	\$90,110
15.00	RO Treatment System Capital Replacement (Year 45, every 50 yrs thereafter)		\$19,360,000		\$387,200,000
15.01	RO Treatment System Capital Replacement (Year 45, every 50 yrs thereafter)	LS	\$16,000,000	20	\$320,000,000
15.02	Project Management	%	\$1,600,000	10	\$32,000,000
15.03	Contingency	%	\$1,760,000	10	\$35,200,000
16.00	Zeolite Treatment System Capital Replacement		\$6,050,000		\$18,150,000
16.01	Zeolite Treatment System Capital Replacement	LS	\$5,000,000	3	\$15,000,000
16.02	Project Management	%	\$500,000	10	\$1,500,000
16.03	Contingency	%	\$550,000	10	\$1,650,000
17.00	EP1 Re-lining (Year 50, every 50 yrs thereafter)		\$7,865,000		\$149,435,000
17.01	EP1 Re-lining (Year 50, every 50 yrs thereafter)	LS	\$6,500,000	19	\$123,500,000
17.02	Project Management	%	\$650,000	10	\$12,350,000
17.03	Contingency	%	\$715,000	10	\$13,585,000
18.00	Treatment Systems Decommissioning (Year 151)				\$220,610
18.01	Decommissioning of zeolite treatment system	LS	\$191,000	1	\$191,000
18.02	Project Management	%		5	\$9,550
18.03	Contingency	%		10	\$20,060
19.00	LTP Cover (Year 1)				\$7,643,570
19.01	Installation of LTP Cover	LS	\$6,317,000	1	\$6,317,000
19.02	Project Management	%		10	\$631,700
19.03	Contingency	%		10	\$694,870
20.00	Treatment Systems Decommissioning (Year 1,001)				\$266,200
20.01	Decommissioning of RO treatment system	LS	\$220,000	1	\$220,000
20.02	Project Management	%	\$22,000	10	\$22,000
20.03	Contingency	%	\$24,200	10	\$24,200
21.00	Well Abandonment/Closure (Year 1,001-1,002)				\$3,376,390
21.01	Alluvial Well Abandonment	EA	\$2,090	903	\$1,887,270
21.02	U. Chinle Well Abandonment	EA	\$2,600	29	\$75,400
21.03	M. Chinle Well Abandonment	EA	\$2,600	54	\$140,400
21.04	L. Chinle Well Abandonment	EA	\$2,600	27	\$70,200
21.05	San Andres Well Abandonment	EA	\$100,000	7	\$700,000
21.06	Reporting	LS	\$50,000	1	\$50,000
21.06	Project Management	%		5	\$146,170
21.07	Contingency	%		10	\$306,950
22.00	Evaporation Pond Decommissioning (Year 1,001)				\$3,262,519
22.01	West Collection Pond	LS	\$210,370	1	\$210,370
22.02	East Collection Pond	LS	\$118,730	1	\$118,730
22.03	EP1 Decommissioning (most costs in STP reclamation)	LS	\$2,351	1	\$2,351
22.04	EP2 Decommissioning	LS	\$710,028	1	\$710,028
22.05	EP3 Decommissioning	LS	\$1,783,199	1	\$1,783,199
22.06	Project Management	%	\$141,240	5	\$141,240
22.07	Contingency	%	\$296,600	10	\$296,600
23.00	Corrective Action piping removal site wide (Year 1,001 - 1,002)				\$2,275,480
23.01	Corrective Action piping removal site wide	LS	\$1,970,100	1	\$1,970,100
23.02	Project Management	%	\$146,560	5	\$98,510
23.03	Contingency	%	\$504,780	10	\$206,870
24.00	Construction Completion Reports (CCR) (includes NRC review costs)				\$600,000
24.01	LTP Cover CCR	LS	\$300,000	1	\$300,000
24.02	Treatment Systems CCR	LS	\$300,000	1	\$300,000
25.00	Long-Term Surveillance Fund (Year 1003)		\$2,500,000	1	\$2,500,000
26.00	TOTAL PERIODIC COSTS (through project closeout)				\$933,310,569