KERR-McGEE CHEMICAL CORPORATION
POST OFFICE BOX 55 • HENDERSON, NEVADA 89015

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ENVIRONMENTAL PROTECTION

April 5, 1984

Mr. H. LaVerne Rosse, P.E.
Program Director, Waste Management Section
Nevada Division of Environmental Protection
Capitol Complex
Carson City, NV 89710

Re: Kerr-McGee Chemical Corporation, Henderson, Nevada
EPA ID No. NVD 008290330

Dear Mr. Rosse:

Transmitted herewith are revised closure/post-closure plans for Kerr-McGee Chemical Corporation's (KMCC) two surface impoundments which at one time stored hazardous waste at the Henderson, Nevada plant. As you know, it is KMCC's intent to close these two HW storage impoundments and one HW landfill facility in accordance with RCRA interim status requirements.

We have amended the previous versions of our closure/post-closure plans for the surface impoundments to address the subjects we have discussed with you during the past three months as well as the items mentioned in both the EPA review document and your letter of November 8, 1983. We have made many revisions in the closure/post-closure plan for the hazardous waste landfill; however, we plan to obtain detailed cost estimates for various closure options. Therefore, as we discussed in our April 3 meeting, we plan to transmit the amended landfill closure plan in approximately a month.

For several reasons, many of the deficiencies listed in the EPA review are not applicable to KMCC's operations. For example, the EPA contractor erroneously assumed that the two surface impoundments (P-1 and S-1) which stored hazardous waste from the potassium perchlorate operation were final disposal facilities and would contain HW after closure. This is not correct because all HW has already been removed from these impoundments. Therefore, post-closure care will not be required.

The contractor also erred in believing that migration of HW components from the impoundments might have contaminated the groundwater and cleanup of groundwater was a necessary part of our closure plan.

These misunderstandings by the EPA contractor are addressed in the revised plans, and the correct interpretations are verified by supporting data.

While our revised RCRA Part A application that was submitted July 14, 1982, correctly reported the HW management facilities at our Henderson plant, we describe them again for your convenient reference as follows:

1. Two surface impoundments, labeled P-1 and S-1, stored a liquid chromium-bearing waste from the potassium perchlorate manufacturing operation. Production of potassium perchlorate was permanently terminated in September, 1982. No hazardous wastes were placed in these impoundments after January 25, 1983. All hazardous wastes have since been removed from both P-1 and S-1 impoundments. This removal was done after consultation with Mr. William D. Wilson, U.S. EPA, Region IX, who advised that such removal constituted only partial closure for which EPA had no permitting or approval authority under interim status regulations.

   Surface impoundment S-1 has been completely emptied and its contents removed, together with the membrane liner and two feet of soil from the bottom and sides. These materials were disposed of in the on-site hazardous waste landfill. Subsequent tests have confirmed that all hazardous waste constituents have been removed from this site.

   Surface impoundment P-1 has not received waste since January 25, 1983. Upon approval of the closure plan, the solids and liner will be removed as described in the attached closure plan.

2. A single-cell landfill was used for the disposal of low-level chromium-bearing filter mud from sodium chlorate production prior to January 25, 1983. Since that date, the landfill has not been used for any purpose, and the filter mud is disposed of off-site at the U. S. Ecology permitted HW facility in Beatty, Nevada. The filter mud from current sodium chlorate production is temporarily deposited in a secure container and shipped to Beatty every week. The amended closure plan for the landfill will be transmitted separately in approximately one month.

3. A single 55-gallon steel drum receives spent solvents. This solvent is reused in the shop area routinely.

In summary, Kerr-McGee wishes to keep its generator status and maintain less than 90-day storage facilities for sodium chlorate filter mud. We believe our amended closure/post-closure plans address the items mentioned in the EPA review document and comply with applicable sections of 40 CFR 265 for interim status closure. We would appreciate your review and early approval of these plans so we can proceed with the closure work.

Will you please contact K. Brothers at (702) 565-8901 if you have any comments or questions

Sincerely,

KERR-McGEE CHEMICAL CORPORATION

R. B. Chase, Jr.
Plant Manager

RBC:jc
Attachment

cc: William D. Wilson, Chief
U.S. EPA, Region IX

Certified Mail No. P 455 597 132
No. P 455 597 133

KERR-McGEE CHEMICAL CORPORATIO

HENDERSON, NEVADA PLANT

HAZARDOUS WASTE CLOSURE/POST-CLOSURE PLAN

I. Background

A revised Part A "Application for a Hazardous Waste Permit" for Kerr-McGee Chemical Corporation's (KMCC) Henderson, Nevada facility was submitted on July 14, 1982 to the U. S. Environmental Protection Agency (EPA), Region IX, with a copy to the Nevada Division of Environmental Protection (NDEP).

This application identified three hazardous wastes generated at the facility, together with the TSD Hazardous Waste Management facilities. These were reported as follows:

1. Liquid waste containing chromium from manufacturing potassium perchlorate which was stored in two lined surface impoundments, designated P-1 and S-1.

2. Filter cake mud containing chromium from the sodium chlorate production process which was disposed of in a hazardous waste landfill located on site.

3. Waste solvents stored in one 55-gallon steel drum.

In September of 1982, KMCC permanently terminated potassium perchlorate production. As described below in the closure plans for ponds S-1 and P-1, the potassium perchlorate operation was completely cleaned and the equipment transferred to other uses. All hazardous materials, including the liner, were removed from pond S-1 and placed in the on-site hazardous waste landfill prior to January 25, 1983. Neither the landfill nor pond P-1 received hazardous waste after January 25, 1983.

At this time, KMCC desires to close the two surface impoundments and the hazardous waste landfill under interim status standards. The generator identification number will be retained to allow off-site shipment of hazardous waste to permitted disposal facilities. The closure/post-closure plans for the two surface impoundments are described below. The closure/post-closure plan for the landfill will be submitted in approximately one month.

II. Closure/Post-Closure Plan for Surface Impoundment S-1

1. History

Pond S-1 was constructed in October of 1974. It was excavated in the native soil and the liner

was installed by Hydraulic Materials, a company which specialized in installing liners for surface impoundments. The excavation was smoothed and the bottom was sealed with 20-mil PVC. The east berm was covered with 30-mil laminated-reinforced CPE and the other three side berms were covered with 30-mil plain CPE. The sides were covered with CPE because of its greater resistance to sunlight. Pond S-1 had an approximate surface area of 47,500 $ft.^2$ and an approximate total volume of 270,000 $ft.^3$. Cleanup and closure of S-1, described below, were completed before January 25, 1983.

2. Maximum Inventory

The maximum hazardous waste inventory that could have been stored in S-1, allowing 2' freeboard, was approximately 1,700,000 gallons. The liquid waste had a total chromium concentration above 5 ppm which made it hazardous by definition. Salts, such as potassium chloride, crystallized on the bottom and sides below the water level as the solution became saturated as the result of solar evaporation. These crystals contained less than 5 ppm chromium when subjected to the "EP Toxicity" test, as shown in the attached data regarding the solid phase of pond P-1. The chromium remained mostly in the liquid phase.

3. Removal of Contents from S-1

Soon after potassium perchlorate production was terminated in 1982, S-1 was removed from service. Some liquid was allowed to solar evaporate, but no additional equipment was used to increase evaporation. The remaining free liquid was transferred by pumps and heavy duty hose lines to pond P-1. The dewatered solids (containing about 10 percent moisture) and the bottom and side liners were removed with a clamshell and paddle scraper. These bulk materials were handled as hazardous wastes and transported to the hazardous waste landfill on site. Also, the two feet of soil under the liner, as well as any contaminated soil resulting from closure, was removed and placed in the landfill.

To demonstrate that all hazardous constituents were removed from S-1 pond area, the following sampling and analyses were conducted:

i) Six soil corings (to a depth of 4') were taken from the pond site area at locations shown in attachments.

ii) To establish background, three soil corings (to a depth of 3') were taken from unaffected areas shown on the attached map.

iii) A composite sample of each coring, made up equal portions from each foot, was subjected to a total nitric acid extraction. The leachate was analyzed for total chromium.

iv) Statistical analysis (student-t test) was used to compare the background samples with those taken from the S-1 pond site. As attachment indicates, the t value is much lower than the t value for 99 percent, which indicates all hazardous constituents have been removed.

There are no plans to fill the pond area. After certification of proper closure, it potentially could be relined and used for a nonhazardous waste impoundment.

4. Decommissioning and Cleanup of Manufacturing Area

When production of potassium perchlorate was terminated, all in-process product was finished and delivered to inventory for commercial sale. All process piping, pumps, and vessels were drained, and the liquors transferred to pond P-1. The entire operation (pipes, vessels, etc.) was flushed with copious amounts of water to remove the hazardous waste component (chromium) as well as any residual salt solution that might remain. All rinsate streams were pumped to pond P-1 for storage, evaporation, and recycle.

After decontamination, as described above, most of the equipment was put in service in other areas of the plant. Unusable piping, tanks, etc., were sold as scrap. Complete cleaning was easily determined because any liquid residue crystallized on the equipment when the water evaporated. This was avoided by thorough flushing followed by inspection of the equipment after drying.

5. Decontamination of Cleanup Equipment

The clamshell, trucks, paddle scraper, transfer pipes, etc., used in the solids removal and cleanup operation were thoroughly flushed with fresh water. The rinsate was delivered to pond P-1.

6. Decontamination of Surrounding Area

Soil around pond S-1 that was contaminated during the cleanup was removed and placed in the hazardous waste landfill. This was monitored by visual and physical inspection. There is no runoff from S-1 since the tops of the berms are about one foot above ground level. In addition, there are no stormwater ditches or drainage systems which run into S-1 that

could be contaminated. As discussed in No. 3, all hazardous waste constituents were removed from the pond site.

7. Pollutant Migration

Any migration of the applicable hazardous waste constituent chromium into the underlying soil would have been detected by the soil sampling and analyses described in No. 3. Also groundwater monitoring, described below, would indicate pollutant migration.

8. Groundwater Monitoring

Closure/post-closure groundwater monitoring is not required for pond S-1 since all hazardous waste constituents have been removed. However, groundwater monitoring in the Henderson plant area is a separate program being conducted under Nevada State Groundwater Regulations. Monitoring in this program includes groundwater in the area of S-1. Data from this program demonstrate that no hazardous waste constituent (i.e., chromium) was traceable to S-1.

9. Closure/Cover Materials

As mentioned in No. 3 above, the pond S-1 site will not be filled, pending a decision to use the area for other purposes. Cover is not required since all hazardous waste constituents have been removed.

10. Closure/Post-Closure Costs

Kerr-McGee has already expended funds in the amount of approximately $30,000 to close pond S-1. Final certification by a Professional Engineer for the two surface impoundments and landfill will cost $1,500.

11. Closure Schedule

As stated above, surface impoundment S-1 was closed prior to January 25, 1983. Sampling and analyses were conducted after the solids and liner had been removed. After approval of closure plans for pond ~~P-1~~ and the landfill, all work will be completed within 180 days, and the work will be monitored by responsible K-M officials and a Registered PE. The NDEP will be properly notified and provided with a certified copy of the PE inspection report.

III. Closure/Post-Closure Plan for Surface Impoundment P-1

1. History

Pond P-1 was constructed in April of 1972 and relined in 1980. The new liner was installed by B. F. Goodrich and consisted of 30-mil Hypalon. Pond P-1 has an approximate surface area of 26,000 ft.^{2} and approximate volume of 125,000 ft.^{3}. Pond P-1 has not received any hazardous waste since January 25, 1983.

2. Maximum Inventory

The maximum hazardous waste inventory that could have been stored in P-1, allowing 2' freeboard, is approximately 700,000 gallons. The liquid waste had a total chromium concentration above 5 ppm which made it hazardous by definition. Salts, such as potassium chloride, have crystallized on the bottom and sides below the water level as the solution became saturated as the result of solar evaporation. These crystals contain less than 5 ppm chromium when subjected to the "EP Toxicity" test, as shown in the attached data.

3. Removal of Contents from P-1

As described in the S-1 closure plan, pond P-1 received some hazardous waste from the closure of S-1 and the decommissioning of the potassium perchlorate manufacturing process. Pond P-1 has not received any hazardous waste since January 25, 1983.

As stated above, the liquid phase of the potassium perchlorate waste contained chromium in excess of 5 ppm. All liquid has been solar evaporated or recycled back to the process to take advantage of chromium's corrosion inhibition characteristics. The pump and line used for recycle were flushed with fresh water and the rinsate placed in pond P-1, and allowed to solar evaporate., No other equipment was used to aid or promote evaporation.

To confirm the remaining solids in pond P-1 were nonhazardous, the solids were sampled and analyzed by Desert Research Institute as specified below:

i) Solid samples were taken from the bottom of the pond at locations shown on the attached map to a depth of one foot.

ii) These solids were subjected to the EP Toxicity Extractions and analyzed for the "EP Toxic" metals.

The attached analyses indicate the remaining solids in pond P-1 are not hazardous. KMCC proposes to remove these solids and liner and place in the on-site nonhazardous waste landfill. After this has been completed, KMCC proposes to demonstrate that no hazardous constituents have migrated from the P-1 pond area as described below in Section 7 "Pollution Migration."

4. Decommissioning of Manufacturing Area

Pond P-1 received wastes from the potassium perchlorate operation as did pond S-1. The decommissioning of the potassium perchlorate production area is described in detail in Section I.4. which is part of the pond S-1 closure plan.

5. Decontamination of Cleanup Equipment

Since the solids remaining in pond P-1 are not hazardous, special care in decontaminating the cleanup equipment will not be necessary.

6. Decontamination of Surrounding Area

Any surrounding soil affected by the removal of the nonhazardous solids in P-1 will be removed and placed in the nonhazardous waste landfill. This will be monitored by visual and physical inspection. Again, it should be noted that the waste remaining in P-1 is not hazardous.

7. Pollutant Migration

Any pollutant migration of the applicable hazardous waste constituent chromium from the liquid waste once contained in pond P-1 will be detected by the following sampling and analyses:

i) Six soil corings (to a depth of 4') will be taken from the pond-site area at locations shown in attachment.

ii) A composite sample of each coring will be made up of equal portions from each foot and subjected to a total nitric acid extraction. The leachate will be analyzed for chromium.

iii) Statistical analysis (student-t test) will be used to compare the results with the background samples as described in the S-1 closure plan (Section II.3.).

If pollutant migration has occurred, soil will be removed, and the pond-site area will be resampled.

This will be done until the chromium concentrations of the remaining soils do not exceed background concentrations. Soil analyses and statistical comparisons will be submitted to the NDEP for their review and concurrence.

Currently, there are no plans to fill the pond area. After certification of proper closure, it potentially could be relined and used for a nonhazardous waste impoundment.

8. Groundwater Monitoring

Closure/post-closure groundwater monitoring will not be required for pond P-1 since all hazardous waste constituents will be removed. However, groundwater monitoring in the Henderson plant area is a separate program being conducted under Nevada State Groundwater Regulations. Monitoring in this program includes groundwater in the area of P-1. Data from this program demonstrate that no hazardous waste constituent (i.e., chromium) was traceable to P-1.

9. Closure/Cover Materials

As mentioned in No. 7 above, the pond P-1 site will not be filled, pending a decision to use the area for other purposes. Cover is not required since all hazardous waste constituents have been removed.

10. Closure/Post-Closure Costs

Kerr-McGee has already expended funds in the amount of approximately $5,000 to recycle liquid from pond P-1 and conduct sampling and analyses. Future closure costs are estimated below:

Removal/Disposal of Solids	-	$10,000
Sampling and Analyses	-	2,000
Administrative	-	2,500
PE Certification	-	500*
Total		$20,000

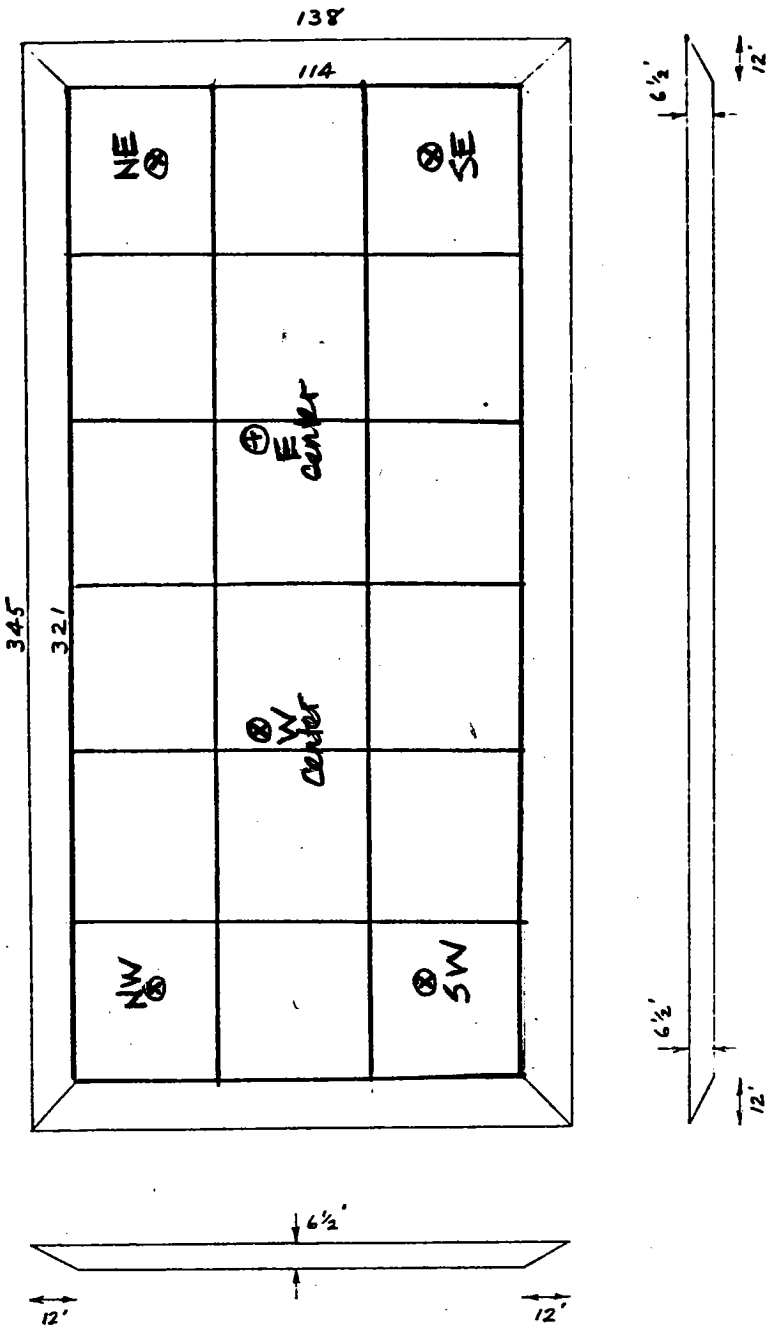
*Based on one-third total certification - $1,500

11. Closure Schedule

After approval of the closure plan, the following schedule will be followed:

Removal/Disposal of solids	- within	60 days
Sampling and analyses	- within	90 days
PE Certification	- within	120 days

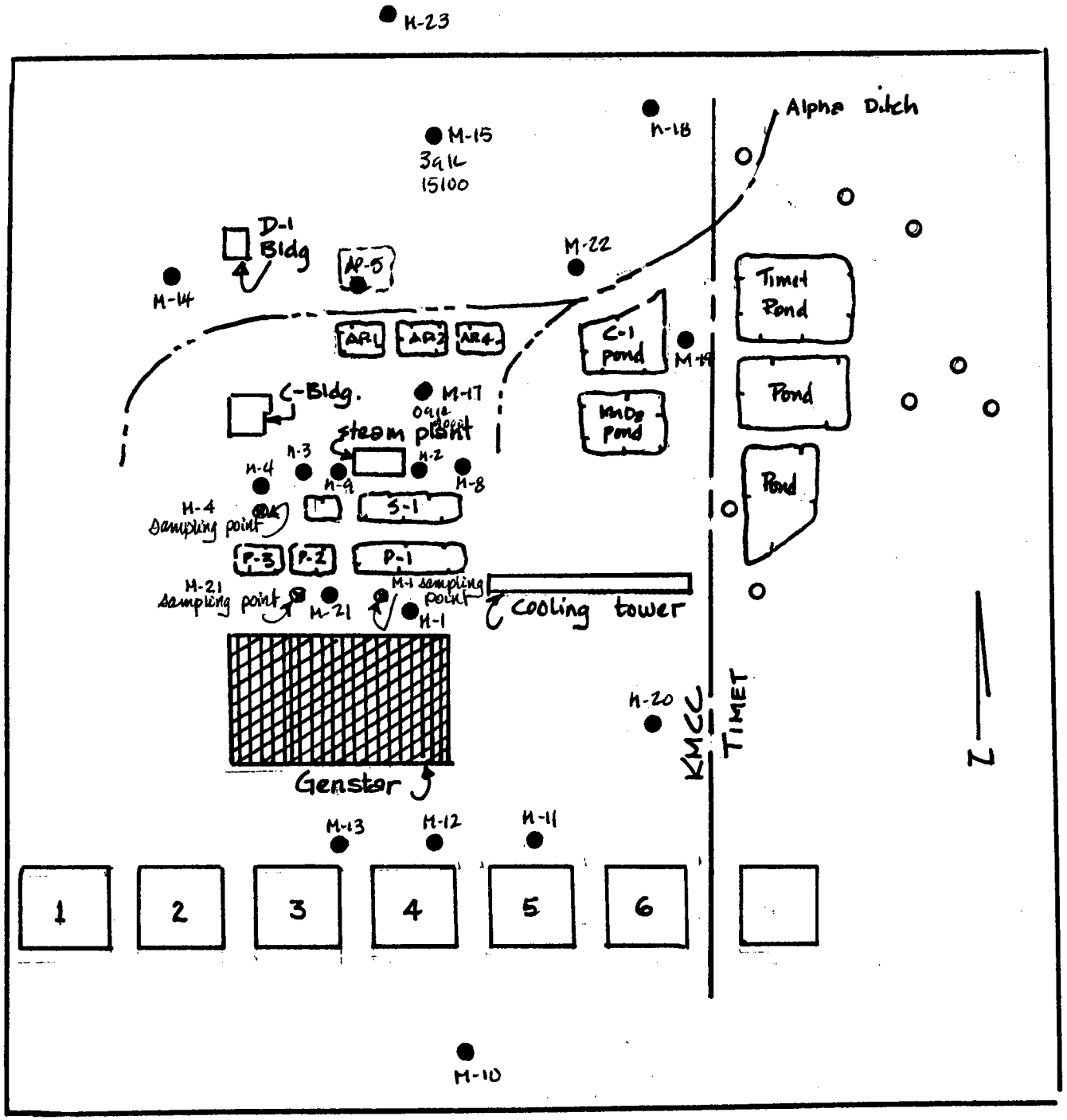
Closure will be monitored by responsible K-M officials and a Registered Professional Engineer. The NDEP will be properly notified and provided with a certified copy of the PE inspection report.



EVAPORATION POND S-1

Analyses Attached

Pond S-1



⊗ location of soil corings taken to establish background

WATER ANALYSIS LABORATORY — REPORT DATE: 21-MAR-84
DESERT RESEARCH INSTITUTE — FILE NAME: 7714KG.TBL

LAB # / DATE	SAMPLE POINT	CR MG/KG
7714 2-MAR-84	S-1 NW CORNER	11.2
7715 2-MAR-84	S-1 SW CORNER	7.7
7716 2-MAR-84	S-1 W CENTER	7.8
7717 2-MAR-84	S-1 E CENTER	14.4
7718 2-MAR-84	S-1 NE CORNER	12.9
7719 2-MAR-84	S-1 SE CORNER	8.4
7720 2-MAR-84	M-1 BACKGROUND	19.0
7721 2-MAR-84	M-21 BACKGROUND	8.0
7722 2-MAR-84	M-4 BACKGROUND	7.5

DATA REPORTED ON A WET WEIGHT BASIS.

calculated t value = 0.37
compared with $t_{0.01}$ with 7 degrees of freedom = 2.998

Therefore no significant difference between background soils and S-1 pond bottom.

See calculations

S-1 Statistical Comparison

Statistical comparison of chromium concentrations of soil corings taken from S-1 surface impoundment bottom and background soil corings. Soil corings were subjected to a total nitric acid extraction and the leachate was analyzed for total chromium. The sampling procedure is explained in detail in the closure/post closure plan.

Student t-test

$$t = \frac{|\bar{X}_1 - \bar{X}_2|}{\sqrt{\frac{\Sigma(X_1-\bar{X}_1)^2 + \Sigma(X_2-\bar{X}_2)^2}{(N_1-1)+(N_2-1)} \times \left(\frac{N_1+N_2}{N_1 N_2}\right)}}$$

Samples from S-1 (conc. mg/kg)

N_1	X_1	$(X_1-\bar{X}_1)$	$(X_1-\bar{X}_1)^2$
1	11.2	11.2 - 10.4	0.64
2	7.7	7.7 - 10.4	7.29
3	7.8	7.8 - 10.4	6.76
4	14.4	14.4 - 10.4	16.00
5	12.9	12.9 - 10.4	6.25
6	8.4	8.4 - 10.4	4.00
	62.4		40.94 $= \Sigma(X_1-\bar{X}_1)^2$

$$\bar{X}_1 = \frac{62.4}{6} = 10.4$$

Background Samples (conc. mg/kg)

N_2	X_2	$(X_2-\bar{X}_2)$	$(X_2-\bar{X}_2)^2$
1	19.0	19.0 - 11.5	56.25
2	8.0	8.0 - 11.5	12.25
3	7.5	7.5 - 11.5	16.00
	34.5		84.50 $= \Sigma(X_2-\bar{X}_2)^2$

Statistical Comparison (Cont.)

$$\bar{X}_2 = \frac{34.5}{3} = 11.5$$

$$t = \frac{|10.4 - 11.5|}{\sqrt{\frac{40.94 + 84.50}{5 + 2} \times \left(\frac{9}{18}\right)}}$$

$$= \frac{1.1}{\sqrt{\frac{125.44}{7} \times 2}} = \frac{1.1}{5.99}$$

$$t = 0.37$$

Degrees of Freedom:

$$N_1 + N_2 - 2 = d.f$$
$$6 + 3 - 2 = 7$$

From Statistical Table t value

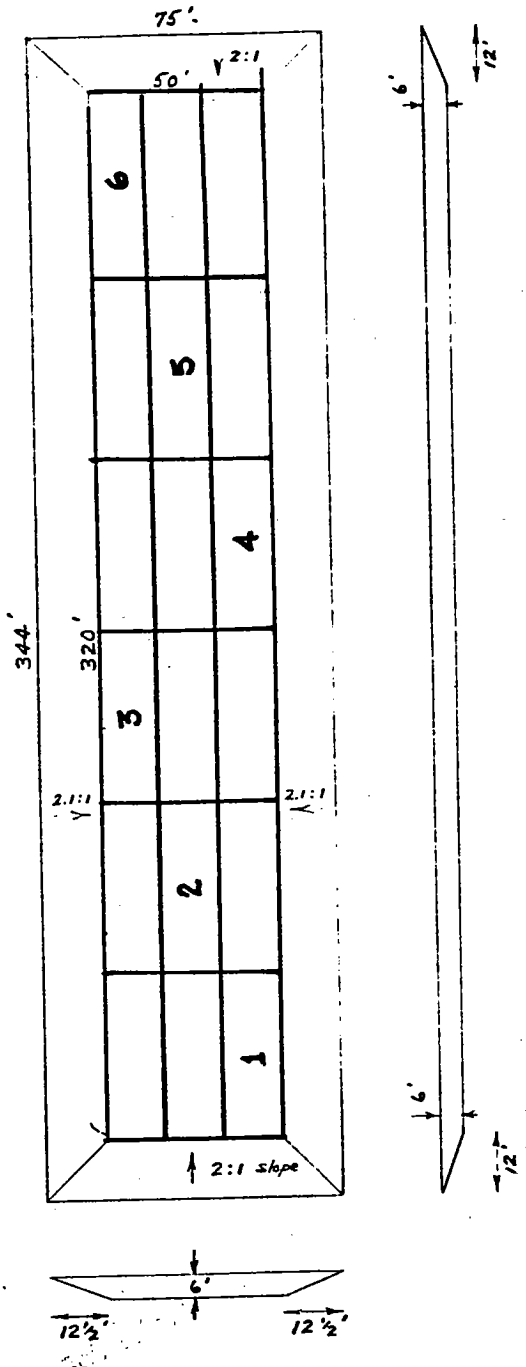
$t_{0.01}$ for 7 degrees of freedom

$= 2.998$

0.37 is much less than 2.998

Therefore there is no statistically significant difference between background soil corings and soil corings from the bottom of the S-1 impoundment

Pond P-1



EVAPORATING POND P-1

Analyses Attached

WATER ANALYSIS LABORATORY
DESERT RESEARCH INSTITUTE

REPORT DATE: 21-MAR-84
FILE NAME: 7724KG.TBL

LAB # / DATE	SAMPLE POINT	AG MG/L	AS MG/L	BA MG/L	CD MG/L	CR MG/L	HG MG/L
7724 / 18-OCT-83	P-1, EP-EX SAMPLE-1	<0.1	<0.1	<0.5	<0.1	1.3	<.002
7725 / 18-OCT-83	P-1, EP-EX SAMPLE-2	<0.1	<0.1	<0.5	<0.1	<.2	<.002
7726 / 18-OCT-83	P-1, EP-EX SAMPLE-3	<0.1	<0.1	<0.5	<0.1	<.2	<.002
7727 / 18-OCT-83	P-1, EP-EX SAMPLE-4	<0.1	<0.1	<0.5	<0.1	0.8	<.002
7728 / 18-OCT-83	P-1, EP-EX SAMPLE-5	<0.1	<0.1	<0.5	0.1	0.7	<.002
7729 / 18-OCT-83	P-1, EP-EX SAMPLE-6	<0.1	<0.1	<0.5	<0.1	1.1	<.002

WATER ANALYSIS LABORATORY
DESERT RESEARCH INSTITUTE

REPORT DATE: 21-MAR-84
FILE NAME: 7724KG.TBL

LAB #	PB MG/L	SE MG/L
7724	<0.5	<0.1
7725	<0.5	<0.1
7726	<0.5	<0.1
7727	<0.5	<0.1
7728	<0.5	<0.1
7729	<0.5	<0.1