SEPARATOR

70-00040

WATER NPDES

P TECH BACKUP

03/14/2003

AR0000752

219 Brown Lane Bryant, AR 72022 (501) 847-7077 (501) 847-7943 fax

GBM^c

March 14, 2003

NPDES PERMIT FILE
NPDES # 752
___ PERMIT
✓ CORRESPONDENCE
___ TECHNICAL BACKUP

Mr. Martin Maner
Acting Chief
Water Division
Arkansas Department of Environmental Quality
P.O. Box 8913
Little Rock, AR 72219-8913

Re: El Dorado Chemical Company (EDCC) – Storm Water Nitrate and Ammonia Characterization for the Outfall 001 Drainage Basin.
GBM^c No. 2042-99-010

Dear Mr. Maner:

Please find transmitted the report concerning the referenced storm water characterization. We greatly appreciate the opportunity to conduct the study and to provide this information in an effort to resolve the NPDES permit issues.

If you have any questions, do not hesitate to contact me or Shon Simpson at 847-7077.

Sincerely,
GBM^c & ASSOCIATES

Vince Blubaugh
Principal

Attachment

CC: Mary Leath, ADEQ (w/o attachments)
Mo Shaffi, ADEQ
John Carver, LSB Industries
Chuck Nestrud, Chisenhall, Nestrud & Julian
Randall Whitmore, EDCC

Received By:
OCT 8 2003
ADEQ Records Management Section

Storm Water Nitrate and Ammonia Characterization for the Outfall 001 Drainage Basin

Prepared for:

El Dorado Chemical Company
4500 North West Avenue
El Dorado, AR 71730

Prepared by:

GBM[c] & Associates
219 Brown Lane
Bryant, AR 72022

March 13, 2003

Contents

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Appendices

1.0 Introduction

As part of the Federal Effluent Guidelines at 40 CFR Part 418, Fertilizer Manufacturing Subcategory, loading credits are assigned for ammonia and nitrate on the basis of production. In addition, it is acknowledged (see 40 CFR 418.40) that ammonia and nitrate contained in precipitation runoff from outside the ammonium nitrate manufacturing battery areas are not accounted for by the production loading credits. Therefore, in order to better assess the total ammonia and nitrate loading to the day pond, and ultimately discharged via Outfall 001, it is necessary to estimate the amount of storm water related ammonia and nitrate reaching the day pond.

A sampling plan was developed to characterize storm water contributions of ammonia and nitrate from outside the battery limits of the ammonium nitrate manufacturing operations areas of the facility. The sampling plan was transmitted to ADEQ on January 22, 2003 and approved by ADEQ Water Division staff via email correspondence.

2.0 Storm Water Sample Collection

Storm water sample collection was to be accomplished a minimum of twice in order to characterize storm water ammonia and nitrate loading to Outfall 001. This was to be accomplished by collection of three grab samples during two separate rainfall events at a total of 10 collection sites that were identified in the sampling plan. The precipitation runoff samples were collected during two storm water events, on February 5 and 14, 2003. Rainfall amounts associated with the sampling events were approximately 0.31 and 0.62 inches, respectively. Sampling for each of the two events lasted about three hours. Rainfall data were obtained through the Southern Regional Climate Center (SRCC) at Louisiana State University using gauged data from the El Dorado Airport, located approximately 6 miles west of the EDCC facility.

The sampling was completed as described in the sampling plan with one exception. Storm water collection site 2 (SCS-2), which was identified in the sampling plan as "northeast of the KT Plant just southwest of the railroad tracks, near the rail loading area" and which was believed to capture runoff from railcar loading, also captured storm water from the KT Plant roof. Since SCS-2 was considered to contain storm water from within the production battery, it was excluded from the study. In order to characterize storm water ammonia and nitrate loading from the rail loading portion of the facility, site SCS-2a was added to the study (Figure 1). SCS-2a was located directly across the railroad tracks north of SCS-2. This site was confirmed to capture only storm water runoff from the rail loading portion of the facility. Because it was not clear that site SCS-2a would be added to the study, it was sampled fewer times than the other locations.

In addition to the storm water collection sites, samples of cooling tower blowdown associated with ammonium nitrate production were also obtained. As discussed in the storm water plan transmittal letter of January 22, 2003, the intent of sampling cooling tower blowdown was to provide ADEQ with updated information regarding the amount of ammonia and nitrate loading sent to Outfall 001 from cooling tower blowdown (Cooling Tower Number 8).

3.0 Sample Collection Results

Raw analytical data, results of the quality assurance samples and chain of custody forms from the two sample collection events are provided in Appendix A. The data for total ammonia and nitrate are shown in Table 1 and Table 2 by site number; summary statistics for both data sets are also shown.

Table 1. Total ammonia (mg/L) as N from two storm water events at various sites in the Outfall 001 drainage basin at the EDCC facility.

Notes	Concentration of ammonia (mg/L) as N at each sample location (two sampling events, three grabs per event) and summary statistics									
	SCS 1	SCS 2a	SCS 3	SCS 4	SCS 5	SCS 6	SCS 7	SCS 8	SCS 9	SCS 10
2/5 #1	600	5,200	480	92	9.9	17	11	44	19	7
2/5 #2	440	6,600	280	100	7.3	200	9	31	32	5.8
2/5 #3	95	NS	390	130	4.7	250	9.3	24	28	4
2/14 #1	2,200	4,600	61	36	13	92	3.4	6.4	30	12
2/14 #2	1,200	NS	69	25	7.9	66	3.7	6.8	24	7.6
2/14 #3	640	NS	170	20	10	84	5.9	6.5	14	7.3
N	6	3	6	6	6	6	6	6	6	6
Average	863	5,467	242	67	8.8	118	7.1	19.8	24.5	7.3
Std Dev	747	1,026	172	46	3	88	3	16	7	3
Conf. Interval.	598	1,161	138	37	2.3	71	2.5	12.7	5.5	2.1
Upper 95th CL	1,460	6,628	379	104	11.1	189	9.6	32.5	30	9.4

Table 2. Total nitrate (mg/L) as N from two storm water events at various sites in the Outfall 001 drainage basin at the EDCC facility.

Notes	Concentration of nitrate (mg/L) as N at each sample location (two sampling events, three grabs per event) and summary statistics									
	SCS 1	SCS 2a	SCS 3	SCS 4	SCS 5	SCS 6	SCS 7	SCS 8	SCS 9	SCS 10
2/5 #1	600	5,500	310	150	52	330	36	5.8	21	78
2/5 #2	410	7,300	330	170	45	360	33	6.5	39	89
2/5 #3	100	NS	440	220	31	430	39	7.5	40	71
2/14 #1	1,400	4,700	80	45	34	140	12	2.6	43	75
2/14 #2	1,400	NS	62	33	23	100	11	2.6	34	53
2/14 #3	750	NS	200	47	52	120	23	3	30	56
N	6	3	6	6	6	6	6	6	6	6
Average	777	5,833	237	110	39.5	246.7	25.7	4.7	34.5	70.3
Std Dev	529	1,332	150	79	12.0	143	12.2	2.2	8.1	13.7
Conf. Interval.	424	1,507	120	63	10	114	10	1.8	6.5	10.9
Upper 95th CL	1,200	7,340	357	174	49.5	361	35.7	6.4	41	81

NS - not sampled

Ammonia concentration averages varied considerably among sites. The minimum average noted was 7.3 mg/L at SCS-10 while the maximum average was found at SCS-2a and was 5,467 mg/L. Areas that were associated with product storage, product loading or processing typically contained higher concentrations of ammonia (as represented by sites SCS-1, 3, 4 and 10). Those four sites had an area weighted mean ammonia concentration of 123 mg/L, (upper 95th percent confidence level = 196 mg/L). Areas of the Outfall 001 drainage basin that were grassy and not associated with storage, loading or processing typically contained lower concentrations of ammonia. Those areas were represented by sites SCS-5, 6, 7, 8 and 9. Those five sites had an area weighted mean ammonia concentration of 15 mg/L, (upper 95th percent confidence level = 24 mg/L). A single site, SCS-2a, reflected railcar loading. The average of three samples collected was appreciably higher than the other sites at 5,467 mg/L ammonia. The upper 95th percent confidence level for the SCS-2a was 6,628 mg/L.

Nitrate concentrations also varied widely among sites. The minimum average nitrate concentration was 4.7 mg/L at SCS-8 while the maximum average concentration was 5,833 mg/L at SCS-2a. As was the situation with ammonia, areas that were associated with product storage, product loading or processing typically contained higher concentrations of nitrate (as represented by sites SCS-1, 3, 4 and 10). Those four sites had an area weighted mean nitrate concentration of 156 mg/L, (upper 95th percent confidence level = 225 mg/L). Areas of the Outfall 001 drainage basin that were grassy and not associated with storage, loading or processing typically contained lower concentrations of nitrate. Those areas were represented by sites SCS-5, 6, 7, 8 and 9. Those five sites had an area weighted mean nitrate concentration of 20 mg/L, (upper 95th percent confidence level = 28 mg/L). Similar to ammonia the average nitrate concentration of three samples collected at SCS-2a was appreciably higher than the other sites at 5,833 mg/L. The upper 95th percent confidence level for the station was 7,340 mg/L.

Concentrations of ammonia and nitrate at the various sites were generally higher during the first sampling event on February 5, 2003 compared with the second sampling event on February 14, 2003.

4.0 Basin Delineation

4.1 Methods

Watershed basins were delineated for each Storm Water Collection Site by visual on-site inspection to determine the boundary of the area that contributed surface runoff to each sampling location. A map of the facility was used to record field observations of drainage paths. Basin delineation was performed during dry conditions, and then the drainage areas were confirmed during a rain event that produced runoff at each sampling location.

The field measurements were then transferred into computer assisted drafting (CAD) software and surface area calculations were performed for each drainage basin. The basin boundaries were overlaid on an electronic version of the facility map and compared to the field observations to check for accuracy.

4.2 Results

The drainage basins for the samples collected were classified into three "area type" categories as shown in Figure 2. These categories were determined based on ground cover, land use, and proximity to process related areas. Area Type 1 included grassy, non-process related areas. Area Type 2 consisted of gravelly, process related areas that include a large amount of impervious structures (roofs, asphalt, concrete). Area Type 3 is the drainage basin that consisted of the railcar loading area. Table 3 summarizes the Area Types sampled showing the sampling locations associated with each type, the surface area included in each type, and the total area of the Outfall 001 drainage basin represented by the locations sampled.

Table 3. Area Type summary (Areas Sampled)

Area Type	Sampling Locations Included	Surface Area (acres)
1	SCS-5, SCS-6, SCS-7 SCS-8, SCS-9	12.57
2	SCS-1, SCS-3, SCS-4, SCS-10	2.01
3	SCS-2A	0.18
Total Drainage Area Sampled		14.76

The remainder of the Outfall 001 drainage basin (20.71 acres) was then characterized as Area Type 1 or 2 in order to perform calculations to model the surface runoff volume for the entire basin. The Outfall 001 drainage basin was segregated as shown below in Table 4.

Table 4. Area Type summary (Outfall 001 Basin)

Area Type	Surface Area (acres)
1	15.97
2	19.32
3	0.18
Total 001 Basin Area	35.47

5.0 Runoff Calculations

5.1 Methods

Surface runoff was derived using the SCS Curve Number Method (Ward, 1995). By this methodology the land use and soil run-off characteristics for the watershed were utilized to construct a model that estimates the amount of run-off in inches per inch of rainfall received. This value can then be applied to the watershed size in acres to achieve a volume of run-off in acre-feet. The SCS curve number equation is represented by:

$$Q = (P-0.2S)^2/(P+0.8S) \qquad \textbf{(Equation 1)}$$

where: P = amount of rainfall in inches
S = (1000/CN)-10
CN = curve number; a coefficient for run-off determined by land use, soil type, and antecedent moisture conditions.

Soils at EDCC were assumed to be poorly drained with a moderate potential for runoff which places them in the "C" hydrologic group. Values utilized in the Equation 1 are summarized below in Table 5.

Table 5. Run-off hydrologic input values.

Area Type	CN	Dominant Land-Use	HSG[1]	AMC Value[2]	Drainage Size
1	86	Poor pasture	C	II	12.57
2	91	Urban industrial	C	II	2.01
3	91	Urban industrial	C	II	0.18

[1] Hydrologic soil group: based on soil characteristics including infiltration rates.
[2] Antecedent moisture condition: AMC II = Normal.

what ( )?

Multiple scenarios were modeled in an attempt to generate an average annual runoff volume for the Outfall 001 drainage basin. To develop these scenarios, rainfall events were listed and ranked based on amount of rainfall, in inches, for the years 2000, 2001, and 2002. Based on these ordered lists, five rainfall intensity ranges were determined to include each rain event contained in the three-year data set. The total amount of rain that occurred during each of the events was summed for each of the rainfall intensity ranges. The total amount of rain for each intensity range was then divided by the corresponding annual rainfall (i.e., 47.94 inches in 2000) to generate a percentage of the annual rainfall that occurred in each intensity range. This data is summarized below in Table 6, Table 7, and Table 8.

Table 6. Rainfall data and calculations for 2000.

2000				
Rainfall Intensity Range (inches)	Number of Events in Range	Amount of Rain (inches)	Annual Total (inches)	Percent of Total
0.1-0.5	12	3.38	47.94	7.1%
0.5-1.0	8	5.81	47.94	12.1%
1.0-3.0	19	34.57	47.94	72.1%
3.0-5.0	1	4.18	47.94	8.7%
5.0 +	0	0	47.94	0%

Table 7. Rainfall data and calculations for 2001.

2001				
Rainfall Intensity Range (inches)	Number of Events in Range	Amount of Rain (inches)	Annual Total (inches)	Percent of Total
0.1-0.5	10	3.06	68.06	4.5%
0.5-1.0	12	9.15	68.06	13.4%
1.0-3.0	11	17.11	68.06	25.1%
3.0-5.0	7	25.93	68.06	38.1%
5.0 +	2	12.81	68.06	18.8%

Table 8. Rainfall data and calculations for 2002.

2002				
Rainfall Intensity Range (inches)	Number of Events in Range	Amount of Rain (inches)	Annual Total (inches)	Percent of Total
0.1-0.5	9	3.22	51.90	6.2%
0.5-1.0	13	9.99	51.90	19.2%
1.0-3.0	22	38.69	51.90	74.5%
3.0-5.0	0	0	51.90	0%
5.0 +	0	0	51.90	0%

The percent of total annual rainfall for each rainfall intensity range was averaged for the three years examined, and the resulting average percentages were applied to the 30-year average rainfall total for El Dorado, Arkansas (SRCC). This process was used to estimate the average annual rainfall that could be anticipated for each range. The total amount of rainfall for each rainfall intensity range was then divided by rainfall amount for that range to determine an average number of events that occur in that range annually. For the rainfall intensity range of 0.1 – 0.5 inches, 0.5 inches was used to determine the annual average number of runoff events. The higher end of the range was selected because the SCS Curve Method equation predicts no or extremely low runoff as a result of low intensity rainfall while we observed an appreciable volume of runoff following a rainfall event of only 0.3 inches. For each of the rainfall intensity ranges below 5.0 inches, the mid point of the range was selected and for the 5.0+ inch range a rainfall of 6 inches was selected. A six-inch rainfall was typical for the two 5.0 inch events that occurred during 2001 (Only two events greater than five inches occurred during the period from 2000 – 2002). This data is shown below in Table 9.

Table 9. Rainfall data and calculations used to simulate 30-year average annual rainfall.

Rainfall Intensity Range (inches)	Average Percentage of Total	30-Year Average Rainfall (inches)	Total Amount of Rainfall per Range per Year (inches)	Annual Average Number of Events per Range
0.1-0.5	5.9%	54.11	3.2	6.4
0.5-1.0	14.9%	54.11	8.1	10.8
1.0-3.0	57.3%	54.11	31.0	15.5
3.0-5.0	15.6%	54.11	8.4	2.1
5.0 +	6.3%	54.11	3.4	0.6

5.2 Results

Surface runoff volume was calculated for each rainfall range and each of the three area types using Equation 1 and the input values shown in Table 5. The volume of runoff per event was then multiplied by the annual average number of events per rainfall intensity range (Table 9) to derive the annual average runoff volume per rainfall intensity range. The sum of the annual average runoff values for each range is equal to the annual average runoff volume for each Area Type. The results for these calculations for Area Types 1, 2, and 3 are listed below in Table 10, 11, and 12 respectively. Individual calculations sheets are shown in Appendix A.

Table 10. Runoff calculation results for Area Type 1.

Area Type 1				
Rainfall Intensity Range (inches)	Rainfall used for Calculation (inches)	Number of Events per Range	Runoff Volume per Event (gallons)	Annual Average Runoff per Range (gallons)
0.1-0.5	0.5	6.4	7,319	46,867
0.5-1.0	0.75	10.8	38,059	410,151
1.0-3.0	2.0	15.5	368,147	5,703,811
3.0-5.0	4.0	2.1	1,104,140	2,330,950
5.0 +	6.0	0.6	1,912,030	1,081,825
Total Annual Average Runoff for Area Type 1				9,573,603

0.5+1=
1.5/2=2

Table 11. Runoff calculation results for Area Type 2.

Area Type 2				
Rainfall Intensity Range (inches)	Rainfall used for Calculation (inches)	Number of Events per Range	Runoff Volume per Event (gallons)	Annual Average Runoff per Range (gallons)
0.1-0.5	0.5	6.4	37,102	237,577
0.5-1.0	0.75	10.8	103,787	1,118,488
1.0-3.0	2.0	15.5	610,419	9,457,399
3.0-5.0	4.0	2.1	1,582,850	3,341,554
5.0 +	6.0	0.6	2,600,479	1,471,348
Total Annual Average Runoff for Area Type 2				15,626,367

Table 12. Runoff calculation results for Area Type 3.

Area Type 3				
Rainfall Intensity Range (inches)	Rainfall used for Calculation (inches)	Number of Events per Range	Runoff Volume per Event (gallons)	Annual Average Runoff per Range (gallons)
0.1-0.5	0.5	6.4	346	2,213
0.5-1.0	0.75	10.8	967	10,421
1.0-3.0	2.0	15.5	5,687	88,112
3.0-5.0	4.0	2.1	14,747	31,132
5.0 +	6.0	0.6	24,228	13,708
Total Annual Average Runoff for Area Type 3				145,587

6.0 Loading Calculations

6.1 Methods

The ammonia and nitrate mass loading rates were calculated based on the results of the data analyses from the rain event sampling and the amount of runoff attributed to each of the sampling locations and the its respective Area Type (as discussed previously in the Basin Delineation Section of this report). As discussed in the Sample Collection Results Section of this report the data from each site were averaged and the 95th percent confidence intervals for each average were developed.

Confidence intervals about the average were developed in order to provide assurance that the concentrations values used to develop the loading estimates adequately reflect average conditions that could reasonably be expected for the Outfall 001 drainage basin. Therefore, the upper 95th percent confidence level for each sample site was selected for use in the loading calculations. The upper 95th percent confidence level represents, with known probability an upper average concentration for each of the sample sites. The upper 95th percent confidence levels for each site are listed in Tables 1 and 2.

The upper 95th percent confidence levels for each station were then weighted based on the percent area represented by the site within its area type, e.g., the site SCS-5 weighting factor was 0.0122 because the area drained at SCS-5 made up 1.22% of the total drainage area of sampled portion of Area Type 1. Weighting factors for each of the sample sites are shown in Table 13.

Table 13. Weighting factors used in the loading calculations.

Sampling Location	Area (acres)	Area 1 Weighting Factor	Area 2 Weighting Factor	Area 3 Weighting Factor
SCS-1	0.067	--	3.33%	--
SCS-2A	0.182	--	--	100%
SCS-3	0.673	--	33.45%	--
SCS-4	0.307	--	15.26%	--
SCS-5	0.153	1.22%	--	--
SCS-6	0.215	1.71%	--	--
SCS-7	6.15	48.91%	--	--
SCS-8	5.75	45.73%	--	--
SCS-9	0.306	2.43%	--	--
SCS-10	0.965	--	47.96%	--
Total Area	14.76	12.57	2.01	0.18

The weighting factors were then applied to the upper 95th percent confidence level of the average for each site, for both ammonia and nitrate. The resulting concentrations were then summed for each Area Type to represent an area-weighted concentration to be multiplied by the Area Type runoff to yield a loading value. The weighted concentrations are shown below in Table 14 and Table 15.

Table 14. Data used to calculate ammonia concentration values used in the loading calculations.

Ammonia	Sampling Location	Average (Upper 95th CL) Concentration (mg/L)	Weighting Factor	Weighted Average (Upper 95th CL) (mg/L)	Total (mg/L)
Area Type 1	SCS-5	11.1	1.22%	0.1	
	SCS-6	118.7	1.71%	3.2	
	SCS-7	9.6	48.91%	4.7	
	SCS-8	32.5	45.73%	14.8	
	SCS-9	30.0	2.43%	0.07	23.6
Area Type 2	SCS-1	1,460	3.33%	48.6	
	SCS-3	379	33.45%	126.9	
	SCS-4	104	15.26%	15.9	
	SCS-10	9.4	47.96%	9.4	195.9
Area Type 3	SCS-2A	6,628	100.0%	6,628	6,628

Table 15. Data used to calculate nitrate concentration totals used in the loading calculations

Nitrate	Sampling Location	Average (Upper 95th CL) Concentration (mg/L)	Weighting Factor	Weighted Average (Upper 95th CL) (mg/L)	Total
Area Type 1	SCS-5	49.1	1.22%	0.6	
	SCS-6	361	1.71%	6.2	
	SCS-7	35.5	48.91%	17.3	
	SCS-8	6.4	45.73%	2.9	
	SCS-9	41	2.43%	1.0	28
Area Type 2	SCS-1	1,200	3.33%	40	
	SCS-3	357	33.45%	119	
	SCS-4	174	15.26%	26.6	
	SCS-10	81	47.96%	39	224.8
Area Type 3	SCS-2A	7,340	100.0%	7,340	7,340

6.2 Results

The results of the loading calculations are shown in Table 16 for ammonia and Table 17 for nitrate. The calculations indicate that the Outfall 001 drainage basin produces an average (at the upper 95th confidence level) of 97 lbs/day of ammonia and 111 lbs/day of nitrate through storm water runoff.

365/year

Table 16. Results of the loading calculations for ammonia.

	Ammonia Concentration (mg/L)	Runoff Volume (gallons/yr)	Annual Runoff Loading (lbs/yr)	Average Daily Runoff Loading (lbs/day)
Area Type 1	23.6	9,573,603	1,885.91	5.17
Area Type 2	195.87	15,626,367	25,526.54	69.94
Area Type 3	6,620.06	145,587	8,038.06	22.02 ‖
Total Average Daily Ammonia Runoff Loading = 97 lbs/day				

(MA.)

Table 17. Results of the loading calculations for nitrate.

	Nitrate Concentration (mg/L)	Runoff Volume (gallons/yr)	Annual Runoff Loading (lbs/yr)	Average Daily Runoff Loading (lbs/day)
Area Type 1	28.04	9,573,603	2,238.82	6.13
Area Type 2	224.84	15,626,367	29,302.03	80.28
Area Type 3	7,340.25	145,587	8,912.52	24.42 12
Total Average Daily Nitrate Runoff Loading = 111 lbs/day				

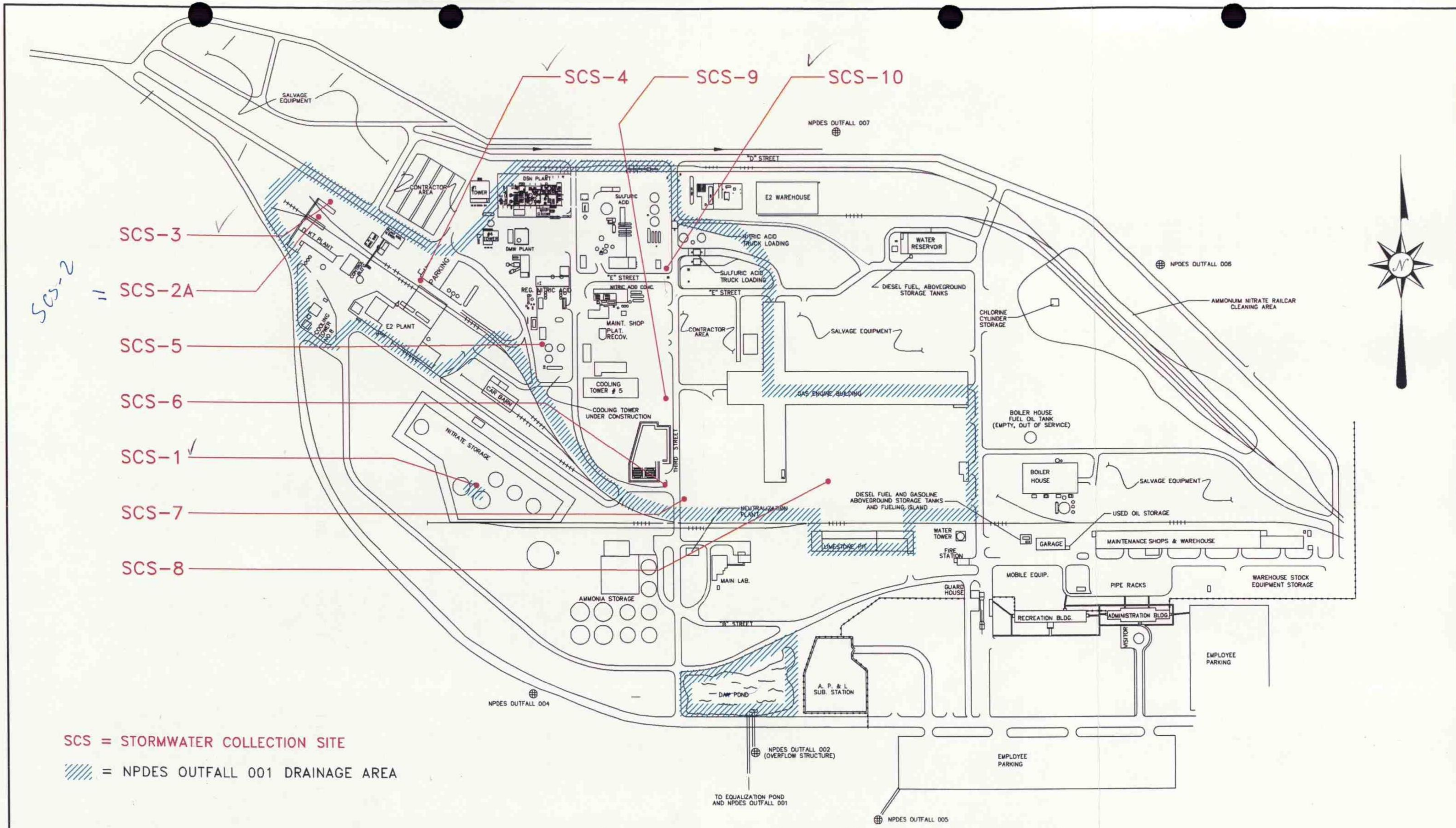
In addition to loading from storm water, ammonia and nitrate loading to Outfall 001 is also contributed from ammonium nitrate manufacturing cooling tower blowdown. This loading source was previously unaccounted for. The 95th percent confidence level of the average concentration of samples from Cooling Tower No. 8 blowdown for ammonia was 203 mg/L and for nitrate was 26 mg/L. The flow rate for the volume of blowdown contributed by the cooling tower was listed as 8 gal/min in the most recent permit application. Therefore the loading contributed by cooling tower blowdown associated with ammonium nitrate manufacturing was 19.5 lb/day and 2.5 lbs/day for ammonia and nitrate, respectively.

The combined loading from storm water and cooling tower blowdown would be 116.5 lbs/day for ammonia and 113.5 lbs/day for nitrate.

by 4-3-03

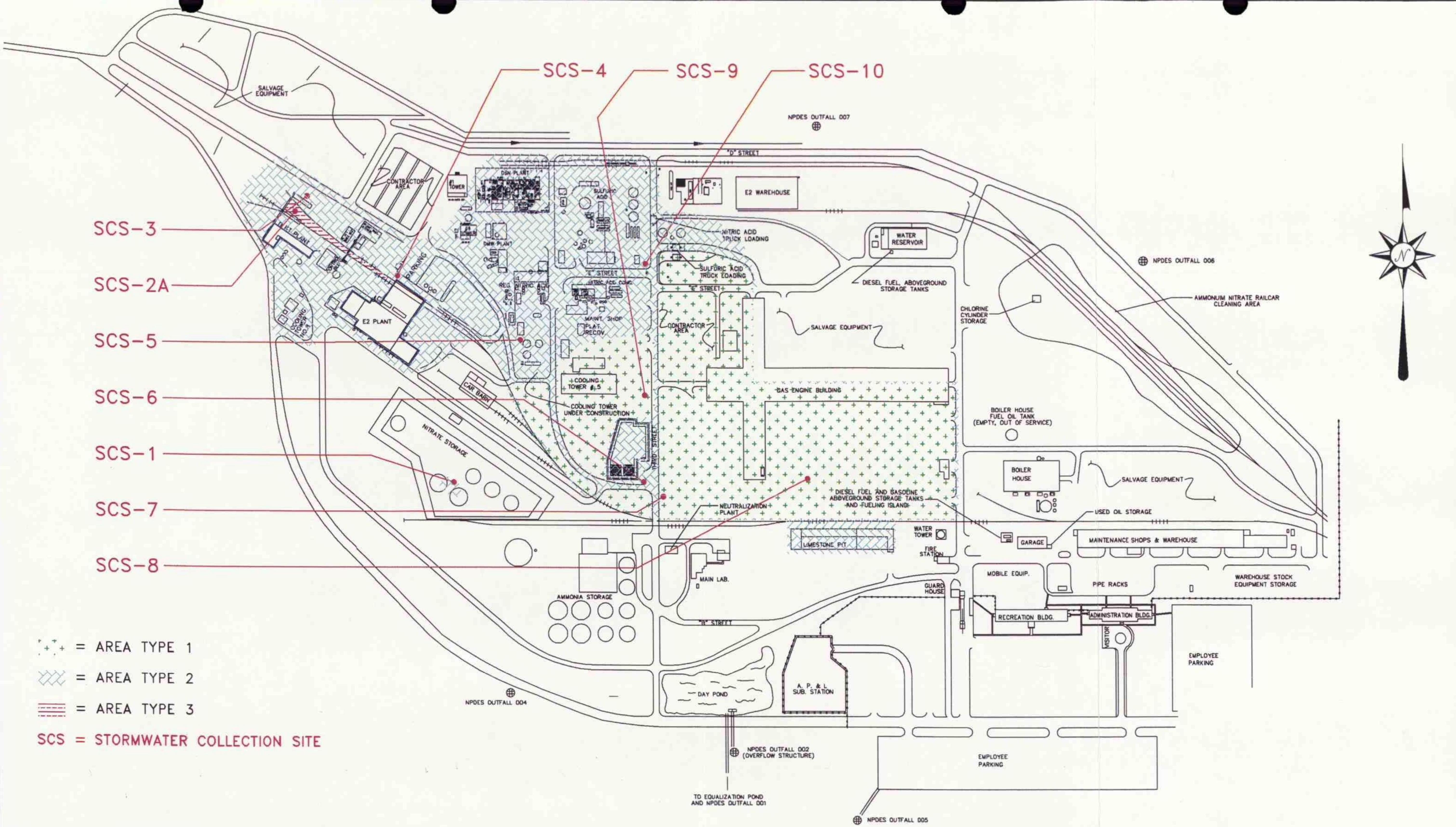
97×2 = 194

111×1.7 = 188.7



GBMc & Associates Strategic Environmental Services	DRAWING NUMBER: 2042-SWSL-1			GBMc	FIGURE 1: STORMWATER SAMPLING LOCATIONS EL DORADO CHEMICAL COMPANY EL DORADO, ARKANSAS
CHECKED BY: AAS	APPROVED BY: SRS	PROJECT NUMBER: 2042-99-010	SCALE: 1"=300'		

DAY	MONTH	YR	NO.	REVISION RECORD	DR	CK	APPR
06	MAR	03		← ORIGINAL DRAWING DATE	RW	AAS	SRS



GBMc & Associates
Strategic Environmental Services

DRAWING NUMBER: 2042-SWSL-2

CHECKED BY: AAS

APPROVED BY: SRS

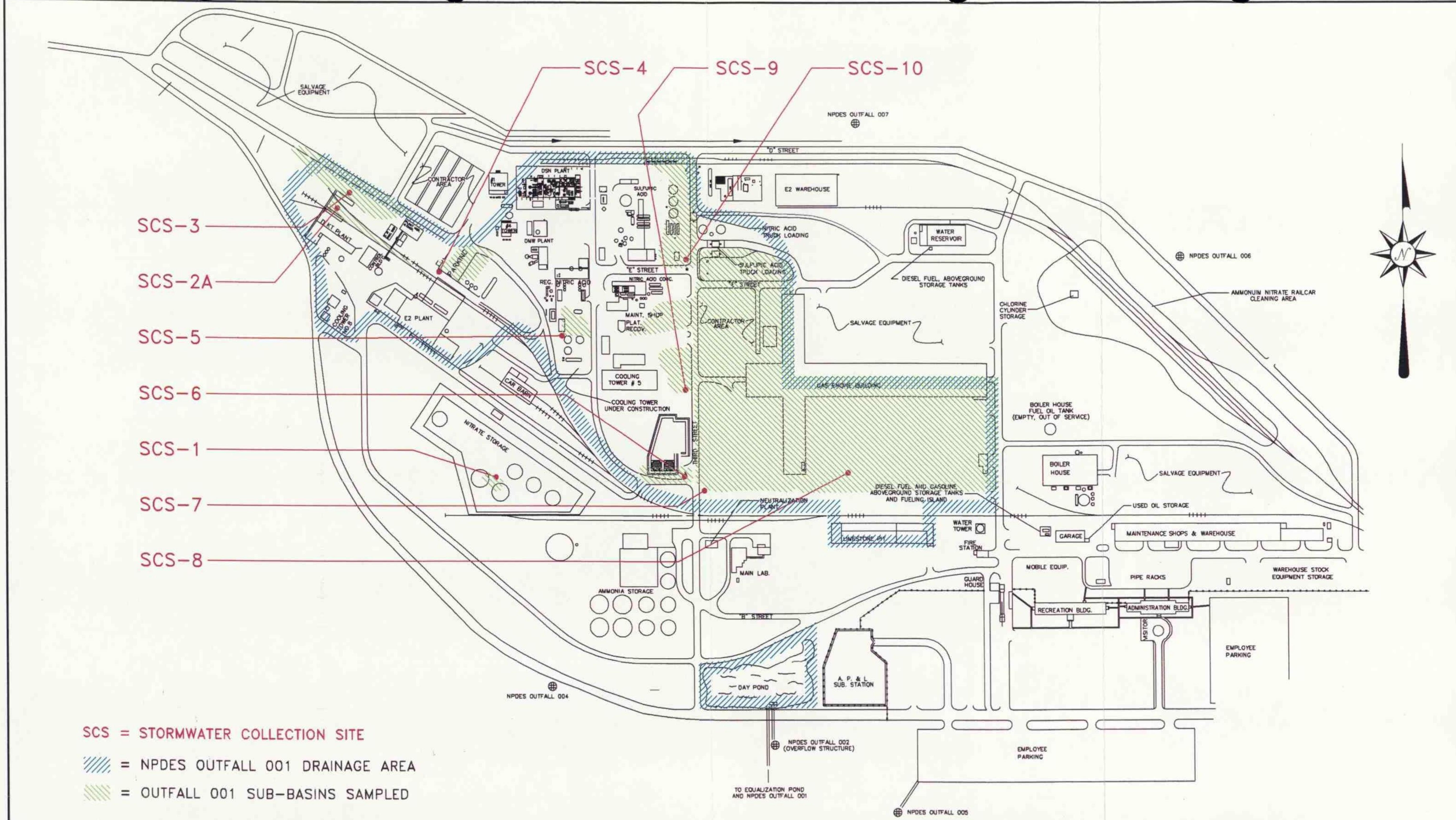
PROJECT NUMBER: 2042-99-010

SCALE: 1"=300'

DAY	MONTH	YR	NO.	REVISION RECORD	DR	CK	APPR
06	MAR	03		← ORIGINAL DRAWING DATE	RW	AAS	SRS

GBMc

FIGURE 2:
STORMWATER SAMPLING LOCATIONS
SHOWING AREA TYPES
EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS



GBM^c & Associates Strategic Environmental Services	DRAWING NUMBER: 2042-SWSL-3	
CHECKED BY: AAS	APPROVED BY: SRS	PROJECT NUMBER: 2042-99-010	SCALE: 1"=300'

DAY	MONTH	YR	NO.	REVISION RECORD	DR	CK	APPR
06	MAR	03		← ORIGINAL DRAWING DATE	RW	AAS	SRS

GBM^c

FIGURE 3:
STORMWATER SAMPLING LOCATIONS
SHOWING THE DRAINAGE AREAS DELINEATED
EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS

Appendix A

Analytical Data and Concentration Calculations

El Dorado Chemical Company
El Dorado, Arkansas
Outfall 001 Drainage Basin
Analytical Data Summary

February 5, 2003

Ammonia an N (mg/L)			
Location	Round 1	Round 2	Round 3
SCS-1	600	440	95
SCS-2	790	520	NO FLOW
SCS-3	480	280	390
SCS-4	92	100	130
SCS-5	9.9	7.3	4.7
SCS-6	17	200	250
SCS-7	11	9	9.3
SCS-8	44	31	24
SCS-9	19	32	28
SCS-10	7	5.8	4
CT-8	190	200	--
SCS-2A	5200	6600	--
SCS-10D	7.1	--	--
SCS-5D	--	7.2	--

February 14, 2003

Ammonia an N (mg/L)			
Location	Round 1	Round 2	Round 3
SCS-1	2200	1200	640
SCS-2	230	150	NO FLOW
SCS-3	61	69	170
SCS-4	36	25	20
SCS-5	13	7.9	10
SCS-6	92	66	84
SCS-7	3.4	3.7	5.9
SCS-8	6.4	6.8	6.5
SCS-9	30	24	14
SCS-10	12	7.6	7.3
CT-8	200	--	--
SCS-2A	4600	--	--
BKG	6.1	1.5	--
SCS-4D	37	--	--
SCS-6D	--	78	--

Nitrate as N (mg/L)			
Location	Round 1	Round 2	Round 3
SCS-1	600	410	100
SCS-2	640	520	NO FLOW
SCS-3	310	330	440
SCS-4	150	170	220
SCS-5	52	45	31
SCS-6	330	360	430
SCS-7	36	33	39
SCS-8	5.8	6.5	7.5
SCS-9	21	39	40
SCS-10	78	89	71
CT-8	23	24	--
SCS-2A	5500	7300	--
SCS-10D	88	--	--
SCS-5D	--	44	--

Nitrate as N (mg/L)			
Location	Round 1	Round 2	Round 3
SCS-1	1400	1400	750
SCS-2	180	100	NO FLOW
SCS-3	80	62	200
SCS-4	45	33	47
SCS-5	34	23	52
SCS-6	140	100	120
SCS-7	12	11	23
SCS-8	2.6	2.6	3
SCS-9	43	34	30
SCS-10	75	53	56
CT-8	15	--	--
SCS-2A	4700	--	--
BKG	12	18	--
SCS-4D	47	--	--
SCS-6D	--	100	--

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

ATTN: Mr. Shon Simpson

Project Description: Thirty-five (35) water sample(s) received on February 7, 2003
2042-99-010

Sample Identification: SCS-1 2/5/03 2115
AIC No. 71339-1

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	600 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	600 mg/l	W9038	07FEB03 1414 93

Sample Identification: SCS-2 2/5/03 2122
AIC No. 71339-2

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	640 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	790 mg/l	W9038	07FEB03 1414 93

Sample Identification: SCS-3 2/5/03 2136
AIC No. 71339-3

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	310 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	480 mg/l	W9038	07FEB03 1414 93

Sample Identification: SCS-2A 2/5/03 2140 Time?
AIC No. 71339-4

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	5500 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	5200 mg/l	W9038	07FEB03 1414 93

Sample Identification: SCS-4 2/5/03 2146
AIC No. 71339-5

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	150 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	92 mg/l	W9038	07FEB03 1414 93

Sample Identification: SCS-5 2/5/03 2150
AIC No. 71339-6

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	52 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	9.9 mg/l	W9038	07FEB03 1414 93

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

Project Description: Thirty-five (35) water sample(s) received on February 7, 2003
2042-99-010

Sample Identification: SCS-6 2/5/03 2153
AIC No. 71339-7

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	330 mg/l	S9946	07FEB03 1305	201/235
Ammonia as N	SM 4500 NH3-E	17 mg/l	W9038	07FEB03 1414	93

Sample Identification: SCS-7 2/5/03 2155
AIC No. 71339-8

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	36 mg/l	S9946	07FEB03 1305	201/235
Ammonia as N	SM 4500 NH3-E	11 mg/l	W9038	07FEB03 1414	93

Sample Identification: SCS-8 2/5/03 2157
AIC No. 71339-9

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	5.8 mg/l	S9946	07FEB03 1305	201/235
Ammonia as N	SM 4500 NH3-E	44 mg/l	W9038	07FEB03 1749	93

Sample Identification: SCS-9 2/5/03 2201
AIC No. 71339-10

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	21 mg/l	S9946	07FEB03 1305	201/235
Ammonia as N	SM 4500 NH3-E	19 mg/l	W9038	07FEB03 1749	93

Sample Identification: SCS-10 2/5/03 2203
AIC No. 71339-11

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	78 mg/l	S9946	07FEB03 1305	201/235
Ammonia as N	SM 4500 NH3-E	7.0 mg/l	W9038	07FEB03 1749	93

Sample Identification: SCS-10D 2/5/03 2204
AIC No. 71339-12

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	88 mg/l	S9946	07FEB03 1305	201/235
Ammonia as N	SM 4500 NH3-E	7.1 mg/l	W9038	07FEB03 1749	93

AMERICAN INTERPLEX CORPORATION
LABORATORIES

REPORT

8600 Kanis Road
Little Rock, AR 72204-2322
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GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

Project Description: Thirty-five (35) water sample(s) received on February 7, 2003
2042-99-010

Sample Identification: SCS-1-2 2/5/03 2208
AIC No. 71339-13

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	410 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	440 mg/l	W9038	07FEB03 1749 93

Sample Identification: SCS-2-2 2/5/03 2213
AIC No. 71339-14

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	520 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	520 mg/l	W9043	10FEB03 0902 201

Sample Identification: CT8 2/5/03 2218
AIC No. 71339-15

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	23 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	190 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-3-2 2/5/03 2224
AIC No. 71339-16

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	330 mg/l	S9946	07FEB03 1305 201/235
Ammonia as N	SM 4500 NH3-E	280 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-2A-2 2/5/03 2228
AIC No. 71339-17

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	7300 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	6600 mg/l	W9038	07FEB03 1749 93

Sample Identification: SCS-4-2 2/5/03 2231
AIC No. 71339-18

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	170 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	100 mg/l	W9043	10FEB03 0902 201

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REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

Project Description: Thirty-five (35) water sample(s) received on February 7, 2003
2042-99-010

Sample Identification: SCS-5-2 2/5/03 2234
AIC No. 71339-19

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	45 mg/l	S9947	07FEB03 1332	201/235
Ammonia as N	SM 4500 NH3-E	7.3 mg/l	W9043	10FEB03 0902	201

Sample Identification: SCS-5-2D 2/5/03 2235
AIC No. 71339-20

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	44 mg/l	S9947	07FEB03 1332	201/235
Ammonia as N	SM 4500 NH3-E	7.2 mg/l	W9043	10FEB03 0902	201

Sample Identification: SCS-6-2 2/5/03 2239
AIC No. 71339-21

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	360 mg/l	S9947	07FEB03 1332	201/235
Ammonia as N	SM 4500 NH3-E	200 mg/l	W9043	10FEB03 0902	201

Sample Identification: SCS-7-2 2/5/03 2241
AIC No. 71339-22

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	33 mg/l	S9947	07FEB03 1332	201/235
Ammonia as N	SM 4500 NH3-E	9.0 mg/l	W9043	10FEB03 0902	201

Sample Identification: SCS-8-2 2/5/03 2244
AIC No. 71339-23

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	6.5 mg/l	S9947	07FEB03 1332	201/235
Ammonia as N	SM 4500 NH3-E	31 mg/l	W9043	10FEB03 0902	201

Sample Identification: SCS-9-2 2/5/03 2246
AIC No. 71339-24

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	39 mg/l	S9947	07FEB03 1332	201/235
Ammonia as N	SM 4500 NH3-E	32 mg/l	W9043	10FEB03 0902	201

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REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

Project Description: Thirty-five (35) water sample(s) received on February 7, 2003
2042-99-010

Sample Identification: SCS-10-2 2/5/03 2249
AIC No. 71339-25

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	89 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	5.8 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-1-3 2/5/03 2252
AIC No. 71339-26

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	100 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	95 mg/l	W9043	10FEB03 0902 201

Sample Identification: CT-8-2 2/5/03 2305
AIC No. 71339-27

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	24 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	200 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-3-3 2/5/03 2307
AIC No. 71339-28

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	440 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	390 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-4-3 2/5/03 2312
AIC No. 71339-29

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	220 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	130 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-5-3 2/5/03 2318
AIC No. 71339-30

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	31 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	4.7 mg/l	W9043	10FEB03 0902 201

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REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

Project Description: Thirty-five (35) water sample(s) received on February 7, 2003
2042-99-010

Sample Identification: SCS-6-3 2/5/03 2320
AIC No. 71339-31

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	430 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	250 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-7-3 2/5/03 2323
AIC No. 71339-32

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	39 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	9.3 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-8-3 2/5/03 2325
AIC No. 71339-33

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	7.5 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	24 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-9-3 2/5/03 2328
AIC No. 71339-34

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	40 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	28 mg/l	W9043	10FEB03 0902 201

Sample Identification: SCS-10-3 2/5/03 2330
AIC No. 71339-35

Parameter	Method	Result	Batch	Time Analyzed By
Nitrate as N	EPA 300.0	71 mg/l	S9947	07FEB03 1332 201/235
Ammonia as N	SM 4500 NH3-E	4.0 mg/l	W9048	10FEB03 1307 201

AMERICAN INTERPLEX CORPORATION
LABORATORIES

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Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

Q C REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 11, 2003
Control No. 71339

Parameter	% Recovery	Relative % Difference	Batch
Nitrate as N	105	0.381	S9946
Nitrate as N	108	0.370	S9947
Ammonia as N	100	0.976	W9038
Ammonia as N	105	2.06	W9043
Ammonia as N	97.9	5.17	W9048

Data has been validated using standard quality control measures (blank, laboratory control, spike and spike duplicate) performed on at least 10% of samples analyzed. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA.
SM method = Standard Methods for the Examination of Water and Wastewaster, 20th edition, 1998.

KH/lims

71557

GBMc & Associates
Strategic Environmental Services
219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

CLIENT INFORMATION	BILLING INFORMATION	SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company: GBMc & Assoc.	Bill To: Shon Simpson	
Project Name/No.: 2042-99-010	Company: (SAME AS CLIENT INFO)	
Send Report To: Shon Simpson	Address:	
Address: 219 Brown Lane		Parameters for Analysis/Methods
Bryant, AR 72022	Phone No.:	
Phone/Fax No.: (501) 847-7077 / 7943	Fax No.:	

	Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	Ammonia	Nitrate
1	SCS-1	—	2/5/03	2115	W	2	GRAB	X	X
2	SCS-2	—	"	2122	"	"	"	X	X
3	SCS-3	—	"	2136	"	"	"	X	X
4	SCS-2A	—	"	2140	"	"	"	X	X
5	SCS-4	—	"	2146	"	"	"	X	X
6	SCS-5	—	"	2150	"	"	"	X	X
7	SCS-6	—	"	2153	"	"	"	X	X
8	SCS-7	—	"	2155	"	"	"	X	X
9	SCS-8	—	"	2157	"	"	"	X	X
	Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						S,I	I

Sampler(s): AAS/RWW/SKW | Shipment Method: GBMc | Turnaround Time Required: NORMAL

COC Completed by: B. Hatcher Date: 2/7/03 Time: 0930 | COC Checked by: SRS Date: 2/7/03 Time: 11:00

Relinquished by: Ricky Wilmoth Date: 2/7/03 Time: 1225 | Received by: ______ Date: ______ Time: ______

Relinquished by: ______ Date: ______ Time: ______ | Received in lab by: V. Cannon Date: 2-7-03 Time: 1225

Rec'd @ 1°C

71339

GBM^c & Associates
Strategic Environmental Services
219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

CLIENT INFORMATION		BILLING INFORMATION		SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company:	(SEE PAGE 1)	Bill To:	(SEE PAGE 1)	
Project Name/No.:		Company:		
Send Report To:		Address:		
Address:				Parameters for Analysis/Methods
		Phone No.:		
Phone/Fax No.:		Fax No.:		

	Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	Ammonia	Nitrate
10	SCS-9	—	2/5/03	2201	W	2	GRAB	X	X
11	SCS-10	—	"	2203	"	"	"	X	X
12	SCS-10D	—	"	2204	"	"	"	X	X
13	SCS-1-2	—	"	2208	"	"	"	X	X
14	SCS-2-2	—	"	2213	"	"	"	X	X
15	CT-8	—	"	2218	"	"	"	X	X
16	SCS-3-2	—	"	2224	"	"	"	X	X
17	SCS-2A-2	—	"	2228	"	"	"	X	X
18	SCS-4-2	—	"	2231	"	"	"	X	X
	Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						S,I	I

Sampler(s): ARS / RWW / SKH
Shipment Method: GBM^c
Turnaround Time Required: Normal

COC Completed by: [signature] Date: 2/7/03 Time: 0930
COC Checked by: [signature] Date: 2/7/03 Time: 11:00

Relinquished by: Ricky Wilmoth Date: 2/7/03 Time: 1225
Received by: ______ Date: ______ Time: ______

Relinquished by: ______ Date: ______ Time: ______
Received in lab by: V Cannon Date: 2-7-03 Time: 1225

Rec'd @ 1°C

71339

GBM[c] & Associates
Strategic Environmental Services
219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

PAGE 3 OF 4

Chain of Custody

CLIENT INFORMATION	BILLING INFORMATION	SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company:	Bill To:	
Project Name/No.:	Company: (SEE PAGE 2)	
Send Report To: (SEE PAGE 2)	Address:	
Address:		Parameters for Analysis/Methods
	Phone No.:	
Phone/Fax No.:	Fax No.:	

	Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	Ammonia	Nitrate							
19	SCS-5-2	—	2/5/03	2234	W	2	GRAB	X	X							
20	SCS-5-2D	—	"	2235	"	"	"	X	X							
21	SCS-6-2	—	"	2239	"	"	"	X	X							
22	SCS-7-2	—	"	2241	"	"	"	X	X							
23	SCS-8-2	—	"	2244	"	"	"	X	X							
24	SCS-9-2	—	"	2246	"	"	"	X	X							
25	SCS-10-2	—	"	2249	"	"	"	X	X							
26	SCS-1-3	—	"	2252	"	"	"	X	X							
27	(SKH) ~~SCS~~ CT-8-2	—	"	2305	"	"	"	X	X							
	Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						S, I	I							

Sampler(s): ARS / RWW / SKH	Shipment Method: GBM[c]	Turnaround Time Required: Normal
COC Completed by: K. Hatzel	Date: 2/7/03 Time: 0930	COC Checked by: SRS Date: 2/7/03 Time: 11:00
Relinquished by: Ricky Wilmoth	Date: 2/7/03 Time: 1225	Received by: Date: Time:
Relinquished by:	Date: Time:	Received in lab by: V. Cannon Date: 2-7-03 Time: 1225

Rec'd @ 1°C

V1.2 10/11/99

71337

GBM^c & Associates

Strategic Environmental Services

219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

CLIENT INFORMATION	BILLING INFORMATION	SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company:	Bill To:	
Project Name/No.: (SEE PAGE 1)	Company: (SEE Page 1)	
Send Report To:	Address:	
Address:		Parameters for Analysis/Methods
	Phone No.:	
Phone/Fax No.:	Fax No.:	

	Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	Ammonia	Nitrate							
28	SCS-3-3	—	2/5/03	2307	W	2	GRAB	X	X							
29	SCS-4-3	—	"	2312	"	"	"	X	X							
30	SCS-5-3	—	"	2318	"	"	"	X	X							
31	SCS-6-3	—	"	2320	"	"	"	X	X							
32	SCS-7-3	—	"	2323	"	"	"	X	X							
33	SCS-8-3	—	"	2325	"	"	"	X	X							
34	SCS-9-3	—	"	2328	"	"	"	X	X							
35	SCS-10-3	—	"	2330	"	"	"	X	X							
	—	—	—	—	"	—	"									
	Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						S,I	I							

Sampler(s): ARS/RWW/SKH	Shipment Method: GBM^c	Turnaround Time Required: Normal
COC Completed by: [signature] Date: 2/7/03	Time: 0930	COC Checked by: SRS Date: 2/7/03 Time: 11:00
Relinquished by: Ricky Wilmoth Date: 2/7/03	Time: 1225	Received by: Date: Time:
Relinquished by: Date:	Time:	Received in lab by: V. Carmona Date: 2-7-03 Time: 1225

Rec'd @ 1°C

AMERICAN INTERPLEX CORPORATION LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 20, 2003
Control No. 71515

ATTN: Mr. Shon Simpson

Project Description: Thirty-five (35) water samples. received on February 15, 2003

Sample Identification: SCS-1 2/14/03 (1515)
AIC No. 71515-1

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	1400 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	2200 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-1-2 2/14/03 (1550)
AIC No. 71515-2

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	1400 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	1200 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-1-3 2/14/03 (1617)
AIC No. 71515-3

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	750 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	640 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-2 2/14/03 (1520)
AIC No. 71515-4

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	180 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	230 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-2-2 2/14/03 (1554)
AIC No. 71515-5

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	100 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	150 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-3 2/14/03 (1529)
AIC No. 71515-6

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	80 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	61 mg/l	W9089	17FEB03 1054	201

AMERICAN INTERPLEX CORPORATION LABORATORIES

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(501) 224-5060
FAX (501) 224-5072

REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 20, 2003
Control No. 71515

Project Description: Thirty-five (35) water samples. received on February 15, 2003

Sample Identification: SCS-3-2 2/14/03 (1557)
AIC No. 71515-7

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	62 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	69 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-3-3 2/14/03 (1627)
AIC No. 71515-8

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	200 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	170 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-4 2/14/03 (1532)
AIC No. 71515-9

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	45 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	36 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-4-2 2/14/03 (1559)
AIC No. 71515-10

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	33 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	25 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-4-3 2/14/03 (1630)
AIC No. 71515-11

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	47 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	20 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-5 2/14/03 (1534)
AIC No. 71515-12

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	34 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	13 mg/l	W9089	17FEB03 1054	201

AMERICAN INTERPLEX CORPORATION LABORATORIES

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(501) 224-5060
FAX (501) 224-5072

REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 20, 2003
Control No. 71515

Project Description: Thirty-five (35) water samples. received on February 15, 2003

Sample Identification: SCS-5-2 2/14/03 (1601)
AIC No. 71515-13

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	23 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	7.9 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-5-3 2/14/03 (1632)
AIC No. 71515-14

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	52 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	10 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-6 2/14/03 (1538)
AIC No. 71515-15

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	140 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	92 mg/l	W9089	17FEB03 1054	201

Sample Identification: SCS-6-2 2/14/03 (1604)
AIC No. 71515-16

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	100 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	66 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-6-3 2/14/03 (1636)
AIC No. 71515-17

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	120 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	84 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-7 2/14/03 (1539)
AIC No. 71515-18

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	12 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	3.4 mg/l	W9094	18FEB03 0816	93

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REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 20, 2003
Control No. 71515

Project Description: Thirty-five (35) water samples. received on February 15, 2003

Sample Identification: SCS-7-2 2/14/03 (1607)
AIC No. 71515-19

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	11 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	3.7 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-7-3 2/14/03 (1637)
AIC No. 71515-20

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	23 mg/l	S10004	15FEB03 1024	201
Ammonia as N	SM 4500 NH3-E	5.9 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-8 2/14/03 (1542)
AIC No. 71515-21

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	2.6 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	6.4 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-8-2 2/14/03 (1609)
AIC No. 71515-22

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	2.6 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	6.8 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-8-3 2/14/03 (1639)
AIC No. 71515-23

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	3.0 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	6.5 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-9 2/14/03 (1544)
AIC No. 71515-24

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	43 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	30 mg/l	W9094	18FEB03 0816	93

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LABORATORIES

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REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 20, 2003
Control No. 71515

Project Description: Thirty-five (35) water samples. received on February 15, 2003

Sample Identification: SCS-9-2 2/14/03 (1611)
AIC No. 71515-25

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	34 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	24 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-9-3 2/14/03 (1642)
AIC No. 71515-26

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	30 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	14 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-10 2/14/03 (1546)
AIC No. 71515-27

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	75 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	12 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-10-2 2/14/03 (1613)
AIC No. 71515-28

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	53 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	7.6 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-10-3 2/14/03 (1644)
AIC No. 71515-29

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	56 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	7.3 mg/l	W9094	18FEB03 0816	93

Sample Identification: BKG-1 2/14/03 (1536)
AIC No. 71515-30

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	12 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	6.1 mg/l	W9094	18FEB03 0816	93

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REPORT

GBMc & Associates, Inc.
219 Brown Lane
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February 20, 2003
Control No. 71515

Project Description: Thirty-five (35) water samples. received on February 15, 2003

Sample Identification: BKG-2 2/14/03 (1603)
AIC No. 71515-31

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	18 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	1.5 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-4D 2/14/03 (1531)
AIC No. 71515-32

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	47 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	37 mg/l	W9094	18FEB03 0816	93

Sample Identification: SCS-6-2D 2/14/03 (1605)
AIC No. 71515-33

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	100 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	78 mg/l	W9103	19FEB03 1056	93

Sample Identification: SCS-2A 2/14/03 (1525)
AIC No. 71515-34

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	4700 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	4600 mg/l	W9103	19FEB03 1056	93

Sample Identification: CT-8 2/14/03 (1518)
AIC No. 71515-35

Parameter	Method	Result	Batch	Time Analyzed	By
Nitrate as N	EPA 300.0	15 mg/l	S10005	15FEB03 1026	201
Ammonia as N	SM 4500 NH3-E	200 mg/l	W9103	19FEB03 1056	93

AMERICAN INTERPLEX CORPORATION
LABORATORIES

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Q C REPORT

GBMc & Associates, Inc.
219 Brown Lane
Bryant, AR 72022

February 20, 2003
Control No. 71515

Parameter	% Recovery	Relative % Difference	Batch
Nitrate as N	99.2	1.01	S10004
Nitrate as N	101	0.0198	S10005
Ammonia as N	102	0.583	W9089
Ammonia as N	101	2.93	W9094
Ammonia as N	104	5.10	W9103

Data has been validated using standard quality control measures (blank, laboratory control, spike and spike duplicate) performed on at least 10% of samples analyzed. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA.
SM method = Standard Methods for the Examination of Water and Wastewaster, 20th edition, 1998.

KH/lims

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AIC 71515

219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

(ASAP)

CLIENT INFORMATION	BILLING INFORMATION	SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company: Eldorado Chemical Company	Bill To:	Fax Results to Aaron Stallmann @ 501-847-7943; Call Aaron or Shon Simpson with Questions @ 501-847-7077
Project Name/No.:	Company: See Client	
Send Report To: Randall Whitmore	Address: Info	
Address: PO Box 231, Eldorado, AR 71731	Phone No.:	
Phone/Fax No.: (870) 863-1498/1499	Fax No.:	

Parameters for Analysis/Methods

Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	NO_3	NH_3
SCS-1	Storm Runoff	2/14/03	1515	W	2	G	X	X
SCS-1-2	"	"	1550	"	"	"	X	X
SCS-1-3	"	"	1617	"	"	"	X	X
SCS-2	"	"	1520	"	"	"	X	X
SCS-2-2	"	"	1554	"	"	"	X	X
~~SCS-2-2~~								
~~SCS-2-3~~	~~"~~			~~"~~	~~"~~	~~"~~		
SCS-3	"	"	1529	"	"	"	X	X
SCS-3-2	"	"	1557	"	"	"	X	X
Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						I	I,S

BJP (initials beside struck-out rows)

Sampler(s): BJP / AAS	Shipment Method: GBMc Delivery	Turnaround Time Required: Normal	
COC Completed by: BJ Phillips	Date: 2/14/03 Time: 1945	COC Checked by: A. Stallmann	Date: 2/14/03 Time: 1955
Relinquished by: BJ Phillips	Date: 2/15/03 Time: 0855	Received by:	Date: Time:
Relinquished by:	Date: Time:	Received in lab by: B. Weems	Date: 15FEB03 Time: 0855

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AIC 715[illegible]

219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

CLIENT INFORMATION		BILLING INFORMATION		SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company:	Eldorado Chemical Company	Bill To:	SAME AS CLIENT	See page 1
Project Name/No.:		Company:		
Send Report To:	Randall Whitmore	Address:		
Address:	PO Box 231			Parameters for Analysis/Methods
	Eldorado, AR 71731	Phone No.:		
Phone/Fax No.:	(870) 863-1498/1499	Fax No.:		

Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	NO_3	NH_3								
SCS-3-3	Storm Runoff	2/14/03	1627	W	2	G	X	X								
SCS-4	"	"	1532	"	"	"	X	X								
SCS-4-2	"	"	1559	"	"	"	X	X								
SCS-4-3	"	"	1630	"	"	"	X	X								
SCS-5	"	"	1534	"	"	"	X	X								
SCS-5-2	"	"	1601	"	"	"	X	X								
SCS-5-3	"	"	1632	"	"	"	X	X								
SCS-6	"	"	1538	"	"	"	X	X								
SCS-6-2	"	"	1604	"	"	"	X	X								
Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						I	I,S								

Sampler(s): AAS/BJP	Shipment Method: GBMc Delivery	Turnaround Time Required: Normal
COC Completed by: [signature] Date: 2/14/03 Time: 1945		COC Checked by: [signature] Date: 2/14/03 Time: 1955
Relinquished by: [signature] Date: 2/15/03 Time: 0855		Received by: Date: Time:
Relinquished by: Date: Time:		Received in lab by: B. Weems Date: 15FEB03 Time: 0855

V1.2 09/25/01

AIC 71515

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219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

3 of 5

CLIENT INFORMATION		BILLING INFORMATION		SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company:	Eldorado Chemical Company	Bill To:		See Page 1
Project Name/No.:		Company:	See Client	
Send Report To:	Randall Whitmore	Address:	Info	
Address:	PO Box 231			Parameters for Analysis/Methods
	Eldorado, AR 71731	Phone No.:		
Phone/Fax No.:	(870) 863-1498/1499	Fax No.:		

Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	NO_3	NH_3								
SCS-6-3	Storm Runoff	2/14/03	1636	W	2	G	X	X								
SCS-7	"	"	1539	"	"	"	X	X								
SCS-7-2	"	"	1607	"	"	"	X	X								
SCS-7-3	"	"	1637	"	"	"	X	X								
SCS-8	"	"	1542	"	"	"	X	X								
SCS-8-2	"	"	1609	"	"	"	X	X								
SCS-8-3	"	"	1639	"	"	"	X	X								
SCS-9	"	"	1544	"	"	"	X	X								
SCS-9-2	"	"	1611	"	"	"	X	X								
Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						I	I, S								

Sampler(s): AAS/BJP	Shipment Method: GBMc Delivery	Turnaround Time Required: Normal
COC Completed by: BJ Phillips Date: 2/14/03 Time: 1945		COC Checked by: A Stallings Date: 2/14/03 Time: 1955
Relinquished by: BJ Phillips Date: 8/15/03 Time: 0855		Received by: Date: Time:
Relinquished by: Date: Time:		Received in lab by: B.Weems Date: 15FEB03 Time: 0855

V1.2 09/25/01

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219 Brown Ln.
Bryant, AR 72022
(501) 847-7077 Fax (501) 847-7943

Chain of Custody

CLIENT INFORMATION	BILLING INFORMATION	SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company: Eldorado Chemical Comp.	Bill To:	Fax results to Aaron Stallmann @ 501-847-7943; Call Aaron or Shun Simpson with any questions. 501-847-70
Project Name/No.:	Company: See Client	
Send Report To: Randall Whitmore	Address: Info	
Address: P.O. Box 231 Eldorado, AR 71731	Phone No.:	
Phone/Fax No.: (870) 863-1498/1499	Fax No.:	

Parameters for Analysis/Methods

Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	NO3	NH3
SCS-9-3	Storm Runoff	2/14/03	1642	W	2	G	X	X
SCS-10	"	"	1546	"	"	"	X	X
SCS-10-2	"	"	1613	"	"	"	X	X
SCS-10-3	"	"	1644	"	"	"	X	X
BKG-1	"	"	1536	"	"	"	X	X
BKG-2	"	"	1603	"	"	"	X	X
SCS-4D	QA/QC	"	1531	"	"	"	X	X
SCS-6-2D	QA/QC	"	1605	"	"	"	X	X
Preservative (Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)							I	I,S

Sampler(s): AAS/BJP

Shipment Method: GBM' Delivery

Turnaround Time Required: Normal

COC Completed by: BJ Phillips Date: 2/14/03 Time: 1945

COC Checked by: A. Stallmann Date: 2/14/03 Time: 1955

Relinquished by: BJ Phillips Date: 2/15/03 Time: 0855

Received by: ________ Date: ________ Time: ________

Relinquished by: ________ Date: ________ Time: ________

Received in lab by: B. Weems Date: 15FEB03 Time: 0855

AIC 71515

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Bryant, AR 72022
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Chain of Custody

CLIENT INFORMATION		BILLING INFORMATION		SPECIAL INSTRUCTIONS/PRECAUTIONS:
Company:	Eldorado Chemical Company	Bill To:		See page 1
Project Name/No.:		Company:	See Client	
Send Report To:	Randall Whitmore	Address:	Info	
Address:	PO Box 231			Parameters for Analysis/Methods
	Eldorado, AR 71731	Phone No.:		
Phone/Fax No.:	(870) 863-1498/1499	Fax No.:		

Sample ID	Sample Description	Date	Time	Matrix S=Sed/Soil W=Water	Number of Containers	Composite or Grab	NO_3	NH_3								
SCS-2A	Storm Runoff	2/14/03	1525	W	2	6	X	X								
CT-8	"	"	1518	"	"	"	X	X								
Preservative	(Sulfuric acid =S, Nitric acid =N, NaOH =B, Ice =I)						I	I,S								

Sampler(s): AAS / BJP

Shipment Method: GBMc & Assoc.

Turnaround Time Required: Normal

COC Completed by: BJ Phillips Date: 2/14/03 Time: 1945

COC Checked by: A. Sandlin Date: 2/14/03 Time: 1955

Relinquished by: BJ Phillips Date: 2/15/03 Time: 0855

Received by: ______ Date: ______ Time: ______

Relinquished by: ______ Date: ______ Time: ______

Received in lab by: B. Weems Date: 15FEB03 Time: 0855

Area Weighting Factors

Sampling Location	Area	Area Type 1 Weighting Factor	Area Type 2 Weighting Factor	Area Type 3 Weighting Factor
SCS-1	0.067 acres		3.33%	
SCS-3	0.673 acres		33.45%	
SCS-4	0.307 acres		15.26%	
SCS-5	0.153 acres	1.22%		
SCS-6	0.215 acres	1.71%		
SCS-7	6.15 acres	48.91%		
SCS-8	5.75 acres	45.73%		
SCS-9	0.306 acres	2.43%		
SCS-10	0.965 acres		47.96%	
SCS-2A	0.182 acres			100.00%
Total Area	14.768 acres	12.57 acres	2.01 acres	0.18 acres

	Ammonia Concentrations (mg/L)					
	Area Type 1					
	SCS-5	SCS-6	SCS-7	SCS-8	SCS-9	
	9.9	17	11	44	19	
02/05/2003	7.3	200	9	31	32	
	4.7	250	9.3	24	28	
	13	92	3.4	6.4	30	
02/14/2003	7.9	66	3.7	6.8	24	
	10	84	5.9	6.5	14	
Average	8.8	118.2	7.1	19.8	24.5	
Weight	1.22%	1.71%	48.91%	45.73%	2.43%	
Std. Error	1.16	36.00	1.30	6.47	2.83	
95% CI (sec 11.7)	2.27	70.56	2.54	12.67	5.54	
Upper 95%CL	11.07	188.73	9.59	32.46	30.04	Total
Weighted Upper 95% CL	0.13	3.23	4.69	14.84	0.73	23.62 mg/L

Ammonia Concentrations (mg/L)				
Area Type 2				
SCS-1	SCS-3	SCS-4	SCS-10	
600	480	92	7	
440	280	100	5.8	
95	390	130	4	
2200	61	36	12	
1200	69	25	7.6	
640	170	20	7.3	
862.5	241.7	67.2	7.3	
3.33%	33.45%	15.26%	47.96%	
304.89	70.21	18.81	1.09	
597.59	137.60	36.87	2.13	
1460.09	379.27	104.04	9.41	Total
48.62	126.86	15.87	4.51	195.87 mg/L

Ammonia Concentrations (mg/L)	
Area Type 3	
SCS-2A	
5200	
6600	
4600	
5466.7	
100.00%	
592.55	
1161.39	
6628.06	Total
6628.06	6628.06 mg/L

Ammonia Concentrations (mg/L)	
Cooling Tower 8	
SCS-2A	
190	
200	
200	
196.7	
100.00%	
3.33	
6.53	
203.20	Total
203.20	203.20 mg/L

	Nitrate Concentrations (mg/L)					
	Area Type 1					
	SCS-5	SCS-6	SCS-7	SCS-8	SCS-9	
	52	330	36	5.8	21	
02/05/2003	45	360	33	6.5	39	
	31	430	39	7.5	40	
	34	140	12	2.6	43	
02/14/2003	23	100	11	2.6	34	
	52	120	23	3	30	
Average	39.5	246.7	25.7	4.7	34.5	
Weight	1.22%	1.71%	48.91%	45.73%	2.43%	
Std. Error	4.89	58.40	4.99	0.89	3.29	
95% CI (sec 11.7)	9.59	114.47	9.78	1.75	6.46	
Upper 95%CL	49.09	361.14	35.45	6.42	40.96	Total
Weighted Upper 95% CL	0.60	6.18	17.34	2.94	1.00	28.04 mg/L

Nitrate Concentrations (mg/L)				
Area Type 2				
SCS-1	SCS-3	SCS-4	SCS-10	
600	310	150	78	
410	330	170	89	
100	440	220	71	
1400	80	45	75	
1400	62	33	53	
750	200	47	56	
776.7	237.0	110.8	70.3	
3.33%	33.45%	15.26%	47.96%	
216.13	61.05	32.36	5.58	
423.61	119.67	63.43	10.94	
1200.28	356.67	174.26	81.28	Total
39.97	119.30	26.59	38.98	224.84 mg/L

Nitrate Concentrations (mg/L)	
Area Type 3	
SCS-2A	
5500	
7300	
4700	
5833.3	
100.00%	
768.84	
1506.92	
7340.25	Total
7340.25	7340.25 mg/L

Nitrate Concentrations (mg/L)	
Cooling Tower 8	
SCS-2A	
23	
24	
15	
20.7	
100.00%	
2.85	
5.58	
26.25	Total
26.25	26.25 mg/L

Appendix B

Appendix B

Runoff Calculations

Runoff Calculations

Rainfall Event 0.5 inch
Soil Group C AMC II
"TR-55" Curve Numbers

Rainfall Amount
P= 0.5 inches

Total Area minus Battery
35.47

$$\frac{(0.5 - 0.2 \times 1.63)^2}{(0.5 + 0.8 \times 1.63)}$$

Area Type 1
Grassy/Non-Production Area
15.97 acres

Curve Number 86.0

S= 1.6279 inches

Q= 0.02 inches ✓

Volume= 7319 gallons VALID

Area Type 2
Gravel/Impervious/Production Area
19.32 acres

Curve Number 91.0

S= 0.9890 inches

Q= 0.07 inches

Volume= 37102 gallons VALID

Area Type 3
KT Rail Loading
0.18 acres

Curve Number 91.0

S= 0.9890 inches

Q= 0.07 inches

Volume= 346 gallons VALID

Rainfall Event 0.75 inch
Soil Group C AMC II
"TR-55" Curve Numbers

Rainfall Amount
P= 0.75 inches

Total Area minus Battery
35.47

Area Type 1
Grassy/Non-Production Area
15.97 acres

Curve Number 86.0

S= 1.6279 inches

Q= 0.09 inches

Volume= 38059 gallons VALID

Area Type 2
Gravel/Impervious/Production Area
19.32 acres

Curve Number 91.0

S= 0.9890 inches

Q= 0.20 inches

Volume= 103787 gallons VALID

Area Type 3
KT Rail Loading
0.18 acres

Curve Number 91.0

S= 0.9890 inches

Q= 0.20 inches

Volume= 967 gallons VALID

Rainfall Event 2 inch
Soil Group C AMC II
"TR-55" Curve Numbers

Rainfall Amount
P= 2 inches

Total Area minus Battery
35.47

Area Type 1
Grassy/Non-Production Area
15.97 acres

Curve Number 86.0

S= 1.6279 inches

Q= 0.85 inches

Volume= 368147 gallons VALID

Area Type 2
Gravel/Impervious/Production Area
19.32 acres

Curve Number 91.0

S= 0.9890 inches

Q= 1.16 inches

Volume= 610419 gallons VALID

Area Type 3
KT Rail Loading
0.18 acres

Curve Number 91.0

S= 0.9890 inches

Q= 1.16 inches

Volume= 5687 gallons VALID

Rainfall Event 4 inch
Soil Group C AMC II
"TR-55" Curve Numbers

Rainfall Amount
P= 4 inches

Total Area minus Battery
35.47

Area Type 1
Grassy/Non-Production Area
15.97 acres

Curve Number 86.0

S= 1.6279 inches

Q= 2.55 inches

Volume= 1104140 gallons VALID

Area Type 2
Gravel/Impervious/Production Area
19.32 acres

Curve Number 91.0

S= 0.9890 inches

Q= 3.02 inches

Volume= 1582850 gallons VALID

Area Type 3
KT Rail Loading
0.18 acres

Curve Number 91.0

S= 0.9890 inches

Q= 3.02 inches

Volume= 14747 gallons VALID

Rainfall Event 6 inch
Soil Group C AMC II
"TR-55" Curve Numbers

Rainfall Amount
P= 6 inches

Total Area minus Battery
35.47

Area Type 1
Grassy/Non-Production Area
15.97 acres

Curve Number 86.0

S= 1.6279 inches

Q= 4.41 inches

Volume= 1912030 gallons VALID

Area Type 2
Gravel/Impervious/Production Area
19.32 acres

Curve Number 91.0

S= 0.9890 inches

Q= 4.96 inches

Volume= 2600479 gallons VALID

Area Type 3
KT Rail Loading
0.18 acres

Curve Number 91.0

S= 0.9890 inches

Q= 4.96 inches

Volume= 24228 gallons VALID

El Dorado, Arkansas
Rainfall Event Summary
2000-2002

2000 Event Intensity (inches)			2001 Event Intensity (inches)	2002 Event Intensity (inches)	
0.12			0.12	0.2	
0.13			0.16	0.22	
0.13			0.22	0.3	
0.13			0.27	0.32	
0.23			0.3	0.38	
0.28			0.3	0.42	
0.28			0.36	0.45	
0.34			0.36	0.46	
0.4			0.47	0.47	3.22
0.41		3.06	0.5	0.58	
0.46			0.53	0.61	
0.47	3.38		0.56	0.63	
0.53			0.64	0.64	
0.55			0.67	0.66	
0.67			0.67	0.7	
0.72			0.79	0.78	
0.72			0.79	0.8	
0.84			0.79	0.86	
0.85			0.86	0.88	
0.93	5.81		0.91	0.94	
1.07			0.96	0.95	
1.11		9.15	0.98	0.96	9.99
1.11			1.04	1.18	
1.16			1.05	1.18	
1.17			1.15	1.22	
1.21			1.18	1.28	
1.3			1.46	1.32	
1.4			1.47	1.33	
1.57			1.56	1.34	
1.75			1.6	1.35	
1.93			2.01	1.35	
2.07			2.05	1.47	
2.14		17.11	2.54	1.5	
2.22			3.1	1.55	
2.34			3.36	1.6	
2.57			3.52	2.03	
2.68			3.6	2.04	
2.86			3.74	2.09	
2.91	34.57		4.12	2.15	
4.18	4.18	25.93	4.49	2.34	
			5.87	2.35	
		12.81	6.94	2.5	
				2.64	
				2.88	38.69
Annual Total (inches) 47.94			68.06	51.9	

El Dorado Chemical Company
Outfall 001 Drainage Basin
Runoff Summary

Area Type 1

Rainfall Ranges	Percentage of events in range for 2000	Percentage of events in range for 2001	Percentage of events in range for 2002	Average Weight	Average rainfall for El Dorado (inches)	Amount per Rainfall Range (inches)	Number of events in Range	# used for runoff calculation (inches)	Runoff Volume per event (gallons)	Total runoff volume (gallons)	Total Volume of Rainfall (gallons)	Percent of total rainfall that is runoff
0-0.5 inch	7.1%	4.5%	6.2%	5.9%	54.11	3.2	6.4	0.5	7,319	46,867	1,388,406	3.4%
0.5-1 inch	12.1%	13.4%	19.2%	14.9%	54.11	8.1	10.8	0.75	38,059	410,151	3,505,039	11.7%
1-3 inch	72.1%	25.1%	74.5%	57.3%	54.11	31.0	15.5	2	368,147	5,703,811	13,437,457	42.4%
3-5 inch	8.7%	38.1%	0.0%	15.6%	54.11	8.4	2.1	4	1,104,140	2,330,950	3,661,948	63.7%
5+ inches	0.0%	18.8%	0.0%	6.3%	54.11	3.4	0.6	6	1,912,030	1,081,825	1,472,166	73.5%
									Total	9,573,603	23,465,015	40.8%

Area Type 2

Rainfall Ranges	Percentage of events in range for 2000	Percentage of events in range for 2001	Percentage of events in range for 2002	Average Weight	Average rainfall for El Dorado (inches)	Amount per Rainfall Range (inches)	Number of events in Range	# used for runoff calculation (inches)	Runoff Volume per event (gallons)	Total runoff volume (gallons)	Total Volume of Rainfall (gallons)	Percent of total rainfall that is runoff
0-0.5 inch	7.1%	4.5%	6.2%	5.9%	54.11	3.2	6.4	0.5	37,102	237,577	1,679,649	14.1%
0.5-1 inch	12.1%	13.4%	19.2%	14.9%	54.11	8.1	10.8	0.75	103,787	1,118,488	4,240,285	26.4%
1-3 inch	72.1%	25.1%	74.5%	57.3%	54.11	31.0	15.5	2	610,419	9,457,399	16,256,210	58.2%
3-5 inch	8.7%	38.1%	0.0%	15.6%	54.11	8.4	2.1	4	1,582,850	3,341,554	4,430,108	75.4%
5+ inches	0.0%	18.8%	0.0%	6.3%	54.11	3.4	0.6	6	2,600,479	1,471,348	1,780,980	82.6%
									Total	15,626,367	28,387,232	55.0%

Area Type 3

Rainfall Ranges	Percentage of events in range for 2000	Percentage of events in range for 2001	Percentage of events in range for 2002	Average Weight	Average rainfall for El Dorado (inches)	Amount per Rainfall Range (inches)	Number of events in Range	# used for runoff calculation	Runoff Volume per event (gallons)	Total runoff volume (gallons)	Total Volume of Rainfall (gallons)	Percent of total rainfall that is runoff
0-0.5 inch	7.1%	4.5%	6.2%	5.9%	54.11	3.2	6.4	0.5	346	2,213	15,649	14.1%
0.5-1 inch	12.1%	13.4%	19.2%	14.9%	54.11	8.1	10.8	0.75	967	10,421	39,506	26.4%
1-3 inch	72.1%	25.1%	74.5%	57.3%	54.11	31.0	15.5	2	5,687	88,112	151,455	58.2%
3-5 inch	8.7%	38.1%	0.0%	15.6%	54.11	8.4	2.1	4	14,747	31,132	41,274	75.4%
5+ inches	0.0%	18.8%	0.0%	6.3%	54.11	3.4	0.6	6	24,228	13,708	16,593	82.6%
									Total	145,587	264,477	55.0%

Appendix C

Appendix C

Rainfall Data for 2/5/03 and 2/14/03 for El Dorado Arkansas

Station: EL DORADO ELD AP
SRCC Preliminary Surface Airways (SA) Observations

	(Date/Time) YY MM DD HH --- CST ---	Tem F	Td F	RH %	WIND Dir deg	WIND Spd kt	WIND Gst kt	SLP mb	Vis mi	Accum Prcp in	Rn Cd	6 Hour TMx F	6 Hour TMn F	Obs Time (UTC)	CLOUDS	WX	REMARKS
SA	03 2 15 1	64	63	97	180	8	.	1007.7	7.0	0.00				06:53	OVC012		AO2
SA	03 2 15 2	64	63	97	210	6	.	.	5.0	0.00				07:53	OVC007	BR	
SA	03 2 15 3	64	63	97	170	6	.	1007.7	3.0	0.03				08:53	OVC005	-RA BR	AO2 RAB04 CIG 003V009
SA	03 2 15 4	64	63	97	170	6	.	1006.9	2.5	0.00	T			09:53	BKN003 OVC010	BR	AO2 RAE0857
SA	03 2 15 5	64	64	100	180	5	.	1007.0	4.0	0.00				10:53	OVC004	TS BR	AO2 LTG DSNT SW AND W TSB48 CIG 002V009
SA	03 2 15 6	62	59	90	210	6	.	1007.0	3.0	0.95		65	62	11:53	OVC021	TSRA BR	AO2 LTG DSNT ALQDS TSE03B05RAB12
SA	03 2 15 7	61	60	97	230	4	.	1007.2	10.0	0.02				12:53	OVC095	-RA	AO2 LTG DSNT S TSE14RAE28B45
SA	03 2 15 8	60	59	97	250	4	.	1008.1	10.0	0.00	T			13:53	BKN110		AO2 RAE1256 PRESRR
SA	03 2 15 9	60	59	97	150	4	.	1009.0	10.0	0.00				14:53	SCT032 BKN110		AO2
SA	03 2 15 10	60	60	100	170	5	.	1008.7	2.5	0.15				15:53	BKN008 BKN014 OVC049	RA BR	AO2 RAB18
SA	03 2 15 11	62	62	100	180	4	.	1008.2	7.0	0.01				16:53	OVC004		AO2 RAE31
SA	03 2 15 12	65	64	97	180	5	.	1008.2	7.0	0.00		65	60	17:53	SCT005 OVC010		AO2 LTG DSNT N
SA	03 2 15 13	66	65	97	160	5	.	1007.8	4.0	0.02				18:53	SCT010 BKN016 OVC060	-RA BR	AO2 RAB34
	03 2 15 14	66	65	97	180	3	.	1006.8	1.8	0.09				19:53	FEW011 BKN020 OVC075	-RA BR	AO2
SA	03 2 15 15	65	64	97	160	8	.	1006.9	1.5	0.11				20:53	SCT025 BKN039 OVC070	+RA BR	AO2
SA	03 2 15 16	62	61	97	150	5	.	1006.6	4.0	0.15				21:53	BKN023 BKN032 OVC080	RA BR	AO2
SA	03 2 15 17	63	62	97	150	5	.	1006.4	7.0	0.10				22:53	BKN031 OVC090	-RA	AO2
SA	03 2 15 18	62	61	97	.	0	.	1006.9	3.0	0.03		66	62	23:53	SCT030 BKN055 OVC085	RA BR	AO2 RAE06B35
SA	03 2 15 19	61	61	100	240	3	.	1007.6	2.5	0.05				00:53	BKN003 OVC038	-RA BR	AO2
SA	03 2 15 20	60	59	97	270	8	.	1008.7	7.0	0.05				01:53	BKN005 BKN022 OVC030	-RA	AO2
SA	03 2 15 21	54	53	96	290	12	.	1010.2	4.0	0.02				02:53 0.02	OVC007	-RA BR	AO2 RAE29B50 CIG 004V011
SA	03 2 15 22	53	51	93	340	11	.	1010.9	10.0	0.00	T			03:53	SCT005 BKN010 OVC020		AO2 RAE18
SA	03 2 15 23	50	49	96	310	11	17	1012.0	4.0	0.01				04:53	OVC008	BR	AO2 CIG 005V012
SA	03 2 15 24	48	46	93	310	10	.	1012.7	6.0	0.00	T	62	48	05:53	SCT006 SCT010 OVC016	BR	AO2 RAB0456E35
	2003 2 15					6.0	17			1.79		66	48	(24)			

SOUTHERN REGIONAL CLIMATE CENTER
Louisiana State University
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Station: EL DORADO ELD AP
SRCC Preliminary Surface Airways (SA) Observations

	(Date/Time) YY MM DD HH --- CST ---	Tem F	Td F	RH %	WIND Dir deg	WIND Spd kt	WIND Gst kt	SLP mb	Vis mi	Accum Prcp in	Rn Cd	6 Hour TMx F	6 Hour TMn F	Obs Time (UTC)	CLOUDS	WX	REMARKS
	03 2 16 1	47	45	93	320	9	.	1013.1	5.0	0.00				06:53	OVC008	BR	AO2 CIG 004V013
SA	03 2 16 2	46	45	96	320	9	.	1013.4	3.0	0.00				07:53	OVC009	BR	AO2 CIG 005V013
SA	03 2 16 3	45	44	96	330	8	.	1013.8	5.0	0.00				08:53	OVC007	BR	AO2 CIG 005V010
SA	03 2 16 4	45	44	96	340	7	.	1014.4	10.0	0.00				09:53	OVC007		AO2 CIG 004V010
SA	03 2 16 5	44	43	96	350	5	.	1014.7	10.0	0.00				10:53	BKN009 OVC014		AO2 CIG 006V012
SA	03 2 16 6	43	41	93	350	6	.	1015.6	10.0	0.01		48	43	11:53	BKN014 OVC023		AO2 RAB06E25
SA	03 2 16 7	43	40	89	350	9	.	1016.1	10.0	0.00				12:53	SCT013 OVC017		AO2
SA	03 2 16 8	41	40	96	350	10	.	1016.9	4.0	0.01				13:53	BKN007 BKN012 OVC019	BR	AO2 RAB23E52 CIG 004V009
SA	03 2 16 9	39	38	96	20	7	.	1018.2	3.0	0.00				14:53	OVC007	BR	AO2 CIG 005V012
SA	03 2 16 10	38	37	96	360	9	.	1018.6	6.0	0.00				15:53	FEW009 OVC014	BR	AO2
SA	03 2 16 11	38	36	93	.	6	.	1018.8	6.0	0.00				16:53	SCT009 OVC014	BR	AO2
SA	03 2 16 12	37	35	93	350	8	.	1018.9	10.0	0.00		43	37	17:53	OVC010		AO2
SA	03 2 16 13	36	34	92	360	6	.	1018.8	9.0	0.00				18:53	OVC010		AO2
SA	03 2 16 14	36	35	96	340	6	.	1018.7	3.0	0.00	T			19:53	BKN010 OVC013	UP BR	AO2 UPB35 CIG 006V012
SA	03 2 16 15	36	35	96	320	7	.	1018.8	5.0	0.00	T			20:53	OVC008	BR	AO2 UPE1958B32E41RAB41E53 CIG 005V013
SA	03 2 16 16	35	34	96	330	9	.	1019.2	4.0	0.00				21:53	BKN010 OVC018	BR	AO2 CIG 006V012
SA	03 2 16 17	35	33	92	320	8	.	1019.1	10.0	0.00				22:53	FEW008 BKN013 OVC020		AO2
SA	03 2 16 18	34	33	96	320	8	.	1019.5	8.0	0.00		37	34	23:53	OVC016		AO2
SA	03 2 16 19	34	31	89	320	8	.	1019.6	10.0	0.00				00:53	FEW013 BKN019 OVC028		AO2
SA	03 2 16 20	33	30	89	340	7	.	1019.9	10.0	0.00				01:53	OVC021		AO2
SA	03 2 16 21	33	30	89	320	6	.	1020.2	10.0	0.00				02:53	OVC013		AO2
SA	03 2 16 22	33	30	89	320	5	.	1020.7	10.0	0.00				03:53	OVC013		AO2
SA	03 2 16 23	32	29	89	.	0	.	1020.4	10.0	0.00				04:53	FEW010 OVC015		AO2
SA	03 2 16 24	32	27	82	.	0	.	1020.4	10.0	0.00		34	32	05:53	BKN024 OVC034		AO2
	2003 2 16					6.8	.			0.02		47	32	(24)			

SOUTHERN REGIONAL CLIMATE CENTER
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Station: EL DORADO ELD AP
SRCC Preliminary Surface Airways (SA) Observations

	(Date/Time) YY	MM	DD	HH (CST)	Tem F	Td F	RH %	WIND Dir deg	WIND Spd kt	WIND Gst kt	SLP mb	Vis mi	Accum Prcp in	Rn Cd	6 Hour TMx F	6 Hour TMn F	Obs Time (UTC)	CLOUDS	WX	REMARKS
SA	03	2	5	1	33	27	79	.	0	.	1023.2	10.0	0.00				06:53	CLR		AO2
SA	03	2	5	2	30	27	89	.	0	.	1023.1	10.0	0.00				07:53	CLR		AO2
SA	03	2	5	3	30	27	89	.	0	.	1023.0	10.0	0.00				08:53	CLR		AO2
SA	03	2	5	4	30	27	89	.	0	.	1023.6	10.0	0.00				09:53	CLR		AO2
SA	03	2	5	5	28	25	89	.	0	.	1024.2	10.0	0.00				10:53	CLR		AO2
SA	03	2	5	6	28	25	89	.	0	.	1024.0	10.0	0.00		33	26	11:53	CLR		AO2
SA	03	2	5	7	26	24	92	.	0	.	1024.4	10.0	0.00				12:53	CLR		AO2
SA	03	2	5	8	31	28	89	50	7	.	1024.3	5.0	0.00				13:53	CLR	BR	AO2
SA	03	2	5	9	37	28	70	80	4	.	1025.2	3.0	0.00				14:53	CLR	HZ	AO2
SA	03	2	5	10	44	21	40	90	8	.	1025.1	10.0	0.00				15:53	BKN100		AO2
SA	03	2	5	11	44	18	35	80	14	.	1024.3	10.0	0.00				16:53	OVC100		AO2
SA	03	2	5	12	44	18	35	70	11	.	1023.6	10.0	0.00		45	26	17:53	OVC100		AO2
SA	03	2	5	13	45	18	34	90	9	.	1022.8	10.0	0.00				18:53	BKN095		AO2
SA	03	2	5	14	45	18	34	100	9	.	1021.6	10.0	0.00				19:53	FEW070 SCT085		AO2
SA	03	2	5	15	45	18	34	150	8	.	1021.8	10.0	0.00				20:53	SCT090		AO2
SA	03	2	5	16	45	19	35	100	7	.	1021.0	10.0	0.00				21:53	SCT085		AO2
SA	03	2	5	17	44	23	44	90	6	.	1021.1	10.0	0.00	T			22:53	BKN060		AO2 RAB43E53
SA	03	2	5	18	39	36	89	60	3	.	1021.9	8.0	0.02		46	39	23:53 (6:53pm)	OVC035	-RA	AO2 RAB14
SA	03	2	5	19	38	37	96	140	6	.	1022.3	6.0	0.09				00:53	SCT029 OVC035	RA BR	AO2
SA	03	2	5	20	37	35	93	90	5	.	1021.7	6.0	0.09				01:53	FEW033 OVC050	RA BR	AO2
SA	03	2	5	21	36	35	96	70	4	.	1021.3	6.0	0.07				02:53	SCT047 OVC060	-RA BR	AO2
SA	03	2	5	22	36	35	96	60	6	.	1021.1	7.0	0.04				03:53	OVC060	-RA	AO2
SA	03	2	5	23	36	35	96	50	7	.	1020.4	2.0	0.00	T			04:53	OVC060	UP BR	AO2 RAE06UPB06E19B35
SA	03	2	5	24	36	36	100	70	5	.	1020.3	5.0	0.00		39	36	05:53	BKN075 OVC085	BR	AO2 UPE0454
	2003	2	5						5.0	.			0.31		46	26	(24)			

SOUTHERN REGIONAL CLIMATE CENTER
Louisiana State University
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Station: EL DORADO ELD AP
SRCC Preliminary Surface Airways (SA) Observations

	YY	MM	DD	HH (CST)	Tem F	Td F	RH %	WIND Dir deg	WIND Spd kt	WIND Gst kt	SLP mb	Vis mi	Accum Prcp in	Rn Cd	6 Hour TMx F	6 Hour TMn F	Obs Time (UTC)	WX	CLOUDS	REMARKS
SA	03	2	6	1	37	36	96	80	4	.	1018.9	9.0	0.00	T			06:53	-RA	FEW005 SCT055 OVC090	AO2 UPB43E47RAB47
SA	03	2	6	2	37	36	96	50	5	.	1018.4	10.0	0.00	T			07:53		OVC070	AO2 RAE0656UPB0656E05
SA	03	2	6	3	37	36	96	50	5	.	1017.9	3.0	0.01				08:53	-RA BR	OVC060	AO2 UPB0759E47RAB01E11B47
SA	03	2	6	4	37	37	100	40	5	.	1016.4	3.0	0.00	T			09:53	-RA BR	OVC055	AO2 UPB01E16B38E50
SA	03	2	6	5	38	37	96	340	6	.	1017.2	3.0	0.04				10:53	RA BR	SCT005 BKN040 OVC047	AO2 PRESRR
SA	03	2	6	6	38	37	96	40	7	.	1016.4	3.0	0.06		38	36	11:53	-RA BR	BKN005 OVC040	AO2
SA	03	2	6	7	38	38	100	20	6	.	1017.3	3.0	0.13				12:53	RA BR	SCT005 BKN008 OVC027	AO2
SA	03	2	6	8	38	38	100	40	7	.	1017.4	3.0	0.21				13:53	RA BR	SCT005 SCT019 OVC039	AO2
SA	03	2	6	9	39	39	100	50	8	.	1017.3	7.0	0.05				14:53	-RA	BKN005 OVC038	AO2 CIG 003V008
SA	03	2	6	10	40	39	96	50	9	.	1016.8	5.0	0.04				15:53	-RA BR	OVC005	AO2 CIG 003V007
SA	03	2	6	11	40	40	100	40	5	.	1017.0	3.0	0.03				16:53	-RA BR	OVC005	AO2
SA	03	2	6	12	40	40	100	30	5	.	1016.5	4.0	0.05		41	38	17:53	RA BR	OVC005	AO2 CIG 003V008
SA	03	2	6	13	41	40	96	50	5	.	1015.5	6.0	0.08				18:53	-RA BR	OVC007	AO2 CIG 003V011
SA	03	2	6	14	41	40	96	40	7	.	1014.5	3.0	0.03				19:53	-RA BR	OVC005	AO2 CIG 003V008
SA	03	2	6	15	41	41	100	360	7	.	1015.0	10.0	0.02				20:53		BKN005 OVC008	AO2 RAE41 CIG 003V007
SA	03	2	6	16	41	40	96	360	5	.	1015.6	10.0	0.00				21:53		OVC005	AO2
SA	03	2	6	17	41	40	96	.	6	.	1016.2	10.0	0.00				22:53		OVC005	AO2
SA	03	2	6	18	40	39	96	10	9	.	1017.4	6.0	0.00		42	40	23:53	BR	OVC003	AO2
SA	03	2	6	19	39	38	96	10	9	.	1018.6	3.0	0.00				00:53	BR	OVC003	AO2 CIG 003V008
SA	03	2	6	20	38	37	96	360	7	.	1020.0	4.0	0.00				01:53	BR	OVC005	AO2 CIG 003V008
SA	03	2	6	21	38	37	96	350	9	15	1021.1	7.0	0.00				02:53		OVC005	AO2 CIG 004V007
SA	03	2	6	22	37	36	96	10	9	.	1021.7	10.0	0.01				03:53		OVC007	AO2
SA	03	2	6	23	37	35	93	360	11	.	1023.0	10.0	0.00				04:53		OVC008	AO2 CIG 006V010
SA	03	2	6	24	37	34	89	10	8	.	1023.8	10.0	0.00		40	37	05:53		BKN014 OVC019	AO2
	2003	2	6						6.8	15			0.76		42	36	(24)			

12:53 am
1:00 am

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SRCC Preliminary Surface Airways (SA) Observations

	YY	MM	DD	HH (CST)	Tem F	Td F	RH %	WIND Dir deg	WIND Spd kt	WIND Gst kt	SLP mb	Vis mi	Accum Prcp in	Rn Cd	6 Hour TMx F	6 Hour TMn F	Obs Time (UTC)	WX	CLOUDS	REMARKS
	03	2	14	1	53	50	90	140	5	.	1014.4	10.0	0.00				06:53		OVC019	AO2
SA	03	2	14	2	54	51	90	160	6	.	1013.3	10.0	0.00				07:53		OVC017	AO2
SA	03	2	14	3	59	56	90	180	8	.	1012.4	10.0	0.00				08:53		OVC015	AO2
SA	03	2	14	4	61	57	87	200	9	.	1012.3	10.0	0.00				09:53		OVC015	AO2
SA	03	2	14	5	62	59	90	190	8	.	1011.8	10.0	0.00				10:53		OVC015	AO2
SA	03	2	14	6	63	60	90	200	10	18	1012.6	10.0	0.00		63	52	11:53		OVC013	AO2
SA	03	2	14	7	62	61	97	190	8	.	1012.1	7.0	0.00				12:53		BKN011 OVC016	AO2
SA	03	2	14	8	63	61	93	190	9	.	1012.1	9.0	0.00				13:53		BKN014 OVC020	AO2
SA	03	2	14	9	64	61	90	190	10	.	1012.0	9.0	0.00				14:53		OVC018	AO2
SA	03	2	14	10	65	61	87	180	10	.	1011.6	10.0	0.00				15:53		OVC016	AO2
SA	03	2	14	11	65	63	93	180	9	.	1010.7	5.0	0.02				16:53	-RA BR	SCT020 OVC026	AO2 LTG DSNT N RAB21
SA	03	2	14	12	65	63	93	180	9	.	1010.1	7.0	0.05		66	62	17:53		OVC020	AO2 RAE46
SA	03	2	14	13	66	63	90	190	10	.	1008.6	10.0	0.00	T			18:53		OVC019	AO2 LTG DSNT NW RAB13E30
	03	2	14	14	68	63	84	190	12	19	1007.8	10.0	0.00				19:53		OVC026	AO2 LTG DSNT W-N
SA	03	2	14	15	67	64	90	210	9	.	1008.1	4.0	0.02				20:53	-RA BR	BKN027 BKN040 OVC048	AO2 TSB1956E11RAB02E25B44
SA	03	2	14	16	65	64	97	210	6	.	1007.9	4.0	0.24				21:53	-RA BR	SCT007 BKN013 OVC020	AO2
SA	03	2	14	17	63	62	97	180	10	.	1008.4	10.0	0.01				22:53		FEW045 OVC080	AO2 RAE12
SA	03	2	14	18	62	61	97	190	7	.	1008.4	10.0	0.00		68	62	23:53		OVC055	AO2
SA	03	2	14	19	63	61	93	190	6	.	1008.3	10.0	0.00				00:53		BKN055 OVC065	AO2
SA	03	2	14	20	61	60	97	160	5	.	1008.4	10.0	0.00				01:53		BKN085	AO2
SA	03	2	14	21	63	62	97	180	10	.	1008.2	10.0	0.00				02:53		FEW110	AO2
SA	03	2	14	22	64	62	93	190	11	.	1008.3	10.0	0.00				03:53		SCT080 BKN095 BKN120	AO2
SA	03	2	14	23	63	62	97	180	8	.	1007.8	10.0	0.00				04:53		CLR	AO2
SA	03	2	14	24	64	62	93	180	9	.	1007.8	9.0	0.00		65	61	05:53		OVC012	AO2
	2003	2	14						8.5	19			0.34		68	52	(24)			

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Appendix D

Cooling Tower #8
Ammonia and Nitrate Loading Calculations

El Dorado Chemical Company
Cooling Tower #8
Ammonia and Nitrate Loading

Ammonia			
	Cooling Tower 8 Flowrate (MGD)	Cooling Tower 8 Concentration (mg/L)	Cooling Tower 8 Loading (lb/day)
Upper 95% CL	0.01152	203.2	19.5

Nitrate			
	Cooling Tower 8 Flowrate (MGD)	Cooling Tower 8 Concentration (mg/L)	Cooling Tower 8 Loading (lb/day)
Upper 95% CL	0.01152	26.2	2.5

Draft Summary and Conclusions in the Matter of EDCC NPDES Permit
AR0000752
Permit Appeal

by
C.M. Maner, P.E.
Technical Services Engineer
October 1, 2002

General

EDCC is in planning segment 2D, not 2E.e

The proposed outfall location for outfall 010 (supposedly Ouachita River) is actually about ½ mile short of the river, or about 2 miles up a small tributary of the Ouachita.

I first reviewed the regulations and the files regarding the various issues subject to EDCC concerns with the NPDES Permit. After forming my own opinions, I met with Water Division Staff for further elucidation on why the permit was written as it was. From the review of the files, the regulations, and the meeting, my determination is that the permit was well written, but done so in a manner that would be conservative for the environment. Im my opinion there was nothing of substance in the permit that went beyond our authority. Specific, major issues are addressed below.

Ground Water and Lake Killdeer Seal Issue

One of the main issues was the sealing of the 50 acre pond, Lake Killdeer. EDCC feels this issue was discussed in CAO 98-119 and that it was accounted for by the Risk Assessment.

My review of Tammie Hynum's memo discussing the Risk Assessment indicates there were many problems with it and my visit with her last month confirmed this. I'm not sure Ms. Hynum's appraisal was ever communicated to EDCC by Department Staff.

One of the issues regarding the ground water was basis for imposing concern about ground water - *Waters response is Act 472 which to parapharase, states that "waters of the state" can't be polluted by wastewater. Groundwater studies show that nitrates in the groundwater beneath Lake Killdeer are about 100 mg/l and north of the plant complex as high as 1000 mg/l. Safe drinking water maximum concentration levels for nitrate is 10 mg/l.*

EDCC asked if any other conditions re: groundwater protection have been part of a NPDES permit. Water Division's response is a pond liner or a soil liner that meets certain permeability requirement are required per Commission Minute Order 80-21, which adopts construction criteria informally known as the Ten State Standards. *The Ten State Standards requires a percolation rate of less than 500 gpd/acre. The Monsanto Chemical Permit Application in 1976 state the pond would have a "Maximum allowable nitrogen leakage of 100 pounds per day will be realized at a water seepage rate of 12 gpm". 12 gpm is equivalent to 17, 280 gpd. For the 50 acre pond, 17, 280 gpd would be 345 gpd per acre. Therefore the proposed rate in the 1976 permit application package would meet the Ten State Standards. To achieve this low rate, a low permeability soil would have to be used. There was a soils report submitted with the 1976 permit application, but it was not in the file. Monsanto was issued permit 1986-w (a state permit) but it was not in the state permit files. Maner was the permit review engineer.*

Act 472

Item 12, page 8, of the EDCC Request for Adjudicatory hearing, dated June 27, 1999, refers to ground water, allowing that the legislature has authorized ADEQ to take enforcement action when "waters of the state" have been polluted. Refers to Consent Orders. Refers to "implementation of a risk-based remedy for the site. Claims risk assessment is still under review. States that CAO 98-119, pg 2(i) requires the one acre pond to be lined, but the fifty acre pond would be resolved through the risk assessment. States that the permit requirement to line the fifty acre pond is contrary to the prior agreement in the CAO. *My review of Tammie Hynums memo on the Risk Assessment indicates there were many problems with it and my visit with her last month confirmed this. I'm not sure Ms. Hynum's appraisal was ever communicated to EDCC by Water Staff.*

Ammonia and Nitrate Loading from Outside Process Area

Regarding outfall 001 EDCC states they have a significant source of nitrate and ammonia into outfall 001. The source is ppt. runoff which falls outside the "battery" area. EDCC has requested that under authority of 403.6(e) (which are for pretreatment standards to POTW's) ammonia and nitrate loadings for these areas should be added to the permit. *Note that 40 CFR 403.6(e), the part of the Reg. EDCC proposes would allow them to do this, is for pretreatment standards for discharges to POTWs. In any case, if flexibility or BPJ is part of the Technology Based Effluent limits, I would advise that Water Quality based limits be used.*

A discharge to the Ouachita River regarding ammonia must be based on the most stringent limits, and must consider both ammonia toxicity and the oxygen demand of ammonia. It appears the permit did not take into account the ammonia limits to meet the dissolved oxygen criteria in the river. The current permit under appeal has the technology based limit of 10.4 mg/l which is more stringent than the Water Quality based value for a discharge to the Ouachita, considering both ammonia toxicity and ammonia oxygen demand. Now there is some confusion on EPA's part of what the appropriate technology value should be. ***Therefore, I would suggest that all the limits be water quality based, with a three year compliance time frame. However, the review of the files over the last 10 or more years looks like there has been much delay regarding the implementation of appropriate limits that would be protective of the environment. As such, the issuance of the permit should be done as expeditiously as possible This will require a firm decision to be made regarding the pipeline to the Ouachita River. I think different scenarios could be evaluated for permit limit determination which would include the City of El Dorado and EDCC, or just EDCC alone discharging to the river.***

Intermittent vs. Continuous Discharge Issue

No. 19 of EDCC's Interrogatories - Asks basis for conclusion that discharges 001, 002, 004, 005, 006, 007 exceed 1 cfs. EDCC's argument is that their discharges are intermittent, not continuous. *Water Staff used the flows submitted in the application. According to Water Staff, the CPP requires the worst case must be considered. Also, see the critical flows definition in Reg. 2, this was used in the determination of critical flow.*

Storm Water Outfall Dilutions based on Relative Drainage Areas

No. 22 of EDCC's Interrogatories- Asks about the ratio of the volume of the EDCC outfalls to the receiving stream flow volumes based on the respective drainage area size. *Water Staff gave EDCC three years to study hydrology to look at this issue. A reopener clause is incorporated in the permit to allow changes to be made to the permit. I feel this adequately addresses the issue.*

Heavy Metals and Clean Sampling Issues

- Item 13, 14, 15, 16, pages 9 and 10 of the EDCC Request for Adjudicatory Hearing: Refers to the metals issues and clean sampling techniques. States that EDCC requested the Director allow EDCC to conduct "clean sampling" during an extended comment period, and the Director improperly refused to extend the period.. Instead, the permit requires "clean sampling" for the first two years of the permit, with a re-opener clause. States that the Director is not allowed to issue a permit that is not based on scientific and engineering practices. *Permit has a reopener clause that will allow permit limits to be modified if clean sampling shows metals are not present in toxic amounts. I feel this adequately addresses the issue.*

Temperature Limits

Issue#7 of EDCC's comments on the final draft permit: Requests that temperature be removed from final permit.

The Water Staff response was: Disagree since the facility discharges boiler blowdown, cooling towers, etc. therefore, temp limit is necessary. *Note that the Woodward-Clyde study shows waste streams in excess of 100 degrees F (third street sump) and 140 degrees F (nitrate area). This study was done in February, one could expect temperatures to be higher in summer. Therefore the facility has processes which contribute waste heat to the wastewater streams.*

The Director's July 31, 2002 letter eliminated the new temperature limits and replaced with temperature limits from the old permit.

Summary and Notes of the Review of Water Division EDCC Permit Files by Maner - September 2002

GENERAL

- EDCC is in planning segment 2D, not 2E.
- The proposed outfall location for outfall 010 (supposedly Ouachita River) is actually about ½ mile short of the river, or about 2 miles up a small tributary of the Ouachita.
- EDCC's web site states that a direct strong nitric (DSN) acid plant was started up in 1995. This may be the reason ammonia levels dramatically increased in that year (see "ADEQ Plots of DMR Data" below).
- The Woodward and Clyde waste stream study reported some ammonia values in waste streams up to 2780 mg/l. Typically, the strong waste streams are 1500 mg/l. Treated effluent may reach 250 to 300 mg/l.
- On what basis does EDCC bring up Section 403 of 40 CFR? My understanding is that they deal with the pretreatment program for industrial discharges to POTWs. EDCC discharges directly to surface waters, not a POTW.
- **Where there is flexibility or uncertainty in regard to the applicability of technology based guidelines, water quality based limits should supercede.**

FTN TMDLs Report (draft) dated March 6, 2002

- States edcc current permit became effective on July 1, 1990 and the facility has been discharging under a CAO dated October 10, 1998. *Note that the limits in this permit exceed those necessary to maintain water quality standards.*
- The report summarizes conclusions in ADEQ TMDL report of 1998.
- The UNT of Flat Creek is on the 303(d) list for ammonia, etc.
- From ADEQ TMDL stream sampling, in-stream ammonia values downstream of the EDCC outfall varies from a minimum of 5.55 mg/l to a maximum of 54.1 mg/l with a median of 20.2 mg/l.
- The FTN TMDL states there must be a reduction in chlorides, sulfates, and TDS in the EDCC tributary.
- High ammonia in the EDCC tributary is due to process and stormwater sources.
- The maximum allowable ammonia concentrations in EDCC effluent based on ammonia toxicity, using EPA's most recently published criteria, are 2.4 mg/l in the summer and 4.0 mg/l in the winter. These values are more stringent than the ammonia values necessary to maintain D.O. standards. (These are 28 mg/l in summer and 38 mg/ in winter, based on FTN modeling. *Our model requires 12 mg/l in summer.*)
- Ammonia values from DMR's 9/30/99 through 9/30/01 as listed in the FTN report are: Outfall 001 Mthly avg: Min=57.4; Max=280; Median = 104.7; Avg = 121.3. The daily maximum values are higher than these mthly avg values

ADEQ PLOTS OF DMR DATA

- Ammonia concentrations significantly begin increasing in Aug-Sep of 1995 and then continue to climb. Prior to 1995, values varied from about 5 to 50 mg/l. After 1995 they varied from about 50 (50 was the minimum from '96 to '99 - the minimum in 2001 was about 100 mg/l) to a maximum of over 300 mg/l in 2001. This would be about 1200 lbs/day to 3500 lbs/day in 2001..

INTERROGATORIES

- No. 14 - b. Has to do with sealing the 50 acre pond c. Asks why CAO 98-119 does not address this issue d. Refers to Risk Based document, 1997, pages 8-1 through 8-3. Balance of #14 discusses the Risk Assessment re: values in the ground water. *My review of Tammie Hynums memo on the RA indicates there were many problems with it and my visit with her last month confirmed this. I'm not sure Ms. Hynum's appraisal was ever communicated to EDCC by Department Staff.*

- No. 15 - Asks basis for imposing concern about ground water - Waters response is Act 472 *Ground water is waters of the State.*

- No. 16 - Asks if any other conditions re: groundwater protection have been part of a NPDES permit. Water Division's response is a pond liner or a soil liner that meets certain permeability requirement are required per Commission Minute Order 80-21, which adopts construction criteria informally known as the 10 State Std's). *The Ten State Standards requires a percolation rate of less than 500 gpd/acre. The Monsanto Chemical Permit Application in 1976 state the pond would have a "Maximum allowable nitrogen leakage of 100 pounds per day will be realized at a water seepage rate of 12 gpm". 12 gpm is equivalent to 17, 280 gpd. For the 50 acre pond, 17, 280 gpd would be 345 gpd per acre. Therefore the proposed rate in the 1976 permit application package would meet the Ten State Standards. To achieve this low rate, a low permeability soil would have to be used. There was a soils report submitted with the 1976 permit application, but it was not in the file. Monsanto was issued permit 1986-w (a state permit) but it was not in the state permit files. Maner was the permit review engineer.*

- No. 17 - Discusses the issue of contributions of ammonia and nitrate sources outside the ammonium nitrate and nitric acid plants. *Note that 40 CFR 403.6(e), the part of the Reg. EDCC proposes would allow them to do this, is for pretreatment standards for discharges to POTWs. In any case, if flexibility or BPJ is part of the Technology Based Effluent limits, I would advise that Water Quality based limits be used.*

- No. 18 - Asks to provide the legal and factual basis for the WQ based concentration limit of 18 mg/l of ammonia...etc, etc. *This would be the D.O. Std's and relevant dissolved oxygen water quality model.*

- No. 19 - Asks basis for conclusion that discharges 001, 002, 004, 005, 006, 007 exceed 1 cfs. EDCC's argument is that their discharges are intermittent, not continuous. *Flows used were from the application. According to Water Staff, the CPP requires the worst case must be considered. Also, see the critical flows definition in Reg. 2.*

- No. 20 - For purposes of Reg. 2 EDCC asks if a there is a difference between a discrete PS and storm water into waters of the state, and if so, what is the difference? *My understanding is that either a PS or storm water discharge must meet the WQS.*

- No. 21 - Asks if the receiving stream designated use that receives 001, 002, 004, 005, 006, 007 was a seasonal fishery instead of perennial, would any effluent limits be different. ADEQ staff answer is NO. *It seems like WQS limits would be different since DO requirement would be slightly less (nuisance prevention).*

- No. 22 - Asks about the ratio of the volume of the EDCC outfalls to the receiving stream flow volumes based on drainage area size. *Water Staff can give EDCC three years to study hydrology to look at this issue. A reopener clause could be incorporated to allow changes to be made to the permit.*

- No. 23 - Asks why impose a "WET" limit on outfalls 010 and 011. *Water Response is to control ammonia toxicity.*

- No. 24 - Asks rationale for imposing chronic as opposed to acute biomonitoring in the NPDES permit. Also asks under what conditions would aquatic life be exposed to outfalls 002, 004, 005, 006, 007 for 5, 6, or 7 days. *Water Staff stated that the CPP requires chronic when the receiving stream 7Q10 flow is less than 100 cfs and the effluent dilution is less than 100:1. Also, the receiving stream has enduring pools. However, staff said they could be flexible on this one.*

- No. 25 - Asks if the TSS discharged from 001 is related to a measure of operation at the facility. *Water staff answer is NO.*

- No. 26 - Asks if the temperature of 001 is influenced by any "man induced causes". If so, please describe each man-induced caused identified, please provide the amount of the temperature increase or decrease which such condition would cause the temp of 001 to change. *Note that processes within the plant produces some water temperatures of over 140 degrees F. The Woodward-Clyde Study revealed the Third Street sump waste stream in excess of 100 degrees F. and the waste stream from the nitrate area in excess of 140 degrees F. This in February.*

- No. 27 - EDCC asks "did you utilize water quality modeling to derive the DO effluent limit for 001?" Identify the input data. Was the model to avg conditions? Instantaneous? If so, please identify the model output which simulated instantaneous conditions. *Staff response is the model assessed instantaneous conditions. It is more conservative than average conditions since it evaluated instantaneous worst case conditions.*

REQUEST for Adjudicatory hearing and Commission Review by Chuck Nestrud, for EDCC, June 27, 1999.

- Item 11, page 7. Refers to groundwater. States Commission has not adopted any designated uses for gw or criteria..

- Item 12, page 8, refers to ground water, allowing that the legislature has authorized ADEQ to take enforcement action when "waters of the state" have been polluted. Refers to Consent Orders. Refers to "implementation of a risk-based remedy for the site. Claims risk assessment is still under review. States that CAO 98-119, pg 2(i) requires the one acre pond to be lined, but the fifty acre pond would be resolved through the risk assessment. States that the permit requirement to line the fifty acre pond is contrary to the prior agreement in the CAO. *My review of Tammie Hynums memo on the Risk Assessment indicates there were many problems with it and my visit with her last month confirmed this. I'm not sure Ms. Hynum's appraisal was ever communicated to EDCC by Water Staff.*

- Item 13, 14, 15, 16, pages 9 and 10. Refers to the metals issues and clean sampling techniques. States that EDCC requested the Director allow EDCC to conduct "clean sampling" during an extended comment period, and the Director improperly refused to extend the period.. Instead, the permit requires "clean sampling" for the first two years of the permit, with a re-opener clause. States that the Director is not allowed to issue a permit that is not based on scientific and engineering practices. *Permit has a reopener clause that will allow permit limits to be modified if clean sampling shows metals are not present in toxic amounts.*

- Technology Based Effluent Limits - Items 17, 18, refer to the technology based effluent limits of the ammonium nitrate and nitric acid plants and the fact that an allowance was not allowed for loadings that originate from outside these areas. Claims there are "applicable effluent guidelines" that apply to outfalls 001, 002, SUM, 010, and 011. *Note EDCC claims that the applicable guidelines are 40 CFR 406.3, but these apply only as pre-treatment guidelines for industrial discharges to POTWs, as I understand them.*

- Item 19, page 12. Refers to water quality based ammonia limit of 18 mg/l (final limit) in 001, 002, and SUM. States the Commission has not adopted criteria for ammonia toxicity. *It is my understanding that the* *limit is based on maintaining D.O. The TMDL done by FTN actually has more stringent toxicity based ammonia limits.*

- Item 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34; pages 12, 13, 14, 15. Refers to water quality based effluent limits for 001, 002, 004, 005, 006 and 007 which are based on ADEQ determination that the receiving stream is a perennial Gulf Coastal stream. EDCC claims this determination is not correct and the limits based on such are not appropriate. The ADEQ staff determination that the stream is perennial is based on the outfall discharge of 1 cfs or more. EDCC claims this is contrary to facts. EDCC claims the discharges (including 001) are intermittent so they do not have a continuous 1 cfs flow, therefore the designation should be seasonal. *Stream has enduring pools.*

- Item 35, 36, 37, 38, pages 17 and 18. These refer to not allowing for upstream storm water flow when calculating water quality based effluent limits for outfalls 002, 004, 005, 006, and 007. Claims these outfalls should be based on the ratio of the drainage areas. *Water Staff can give EDCC three years to study hydrology to look at this issue. A reopener clause could be incorporated to allow changes to be made to the permit.*

- Item 39, 40, pages 18 and 19. These refer to imposition of WET limits for outfalls 001, 002, 004, 005, 006, 007 and outfalls 010 and 011. Claims no historical evidence for biomonitoring failures at 010 or 011 since they are not built yet. Claims WET limits should not be imposed until a permittee has failed the required biomonitoring tests, and has completed a TRE (toxicity reduction evaluation). Claims previous biomonitoring for outfall 001 shows there is no evidence of acute toxicity at the proposed critical dilution of 17%. *Monitoring shows toxicity. A reopener clause could be incorporated to allow changes to be made to the permit.*

- Item 41, 42, 43, pages 19, 20. Refers to inappropriate chronic toxicity tests on 002, 004, 005, 006, 007 because they are intermittent type discharges, would not persist for seven days. Item 43 says acute test would be more appropriate. *The receiving stream has enduring pools.*

- Item 46, page 21. Refers to WET limit testing, dissolved mineral testing and metals testing for 001 need not be more frequent that 1/qtr. *Note that Killdeer lake is 50 acres, with an average depth of about 5 feet deep. Therefore volume is 11,000,00 cu.ft. or about 82,000,000 gallons. With an effluent flow of about 1.8 mgd, the HRT would be about 45 days or 1 ½ months (note this discounts large rainfall events, which would lessen the HRT. Once per quarter (once every three months) is not frequent enough. The Director's letter of July 31, 2002 changed the sampling frequency for dissolved minerals from three per week to once per month.*

- Item 47, page 21. States that 002, 004, 005, 006, 007 are storm water, therefore 1/qtr should be frequent enough. *Rainfall events will be more frequent than this. Poor level of housekeeping has potential for spills and material loss that may not be monitored on a once per qtr basis.*

- Items 48 and 49, pages 21 and 22. Refers to metals limits and mass for 001, 002, 004, 005, 006, 007, saying the limits are inappropriate... *Note that the permit has a re-opener clause. This should cover this issue.*

- Items 50, 51, 52, page 23. Refers to TSS mass limits for 001, 010, and 011. States there is no regulatory basis for the inclusion of mass TSS limits, nor is restriction necessary for WQS. States ADEQ cites 40 CFR 122.45(f) as the reg basis. EDCC claims 40 CFR 122.45(f)(iii) provides that when mass limits "cannot" be related to a measure of operation, the permitting authority should not impose a mass limit. *Mass based limits are required by NPDES regulations at 40 CFR 122.45(f).*

- Items 53 and 54, page 23 and 24. States there is no regulatory basis for the inclusion of mass limits for dissolved minerals on outfall 001. Claims 40 CFR 122.45(f)(ii) provides an exception to this. *Marcus's letter of July 31, eliminated requirement of mass limits for minerals.*

- Items 55, 56, 57, and 58, pages 24 and 25. Refers to permit temperature requirement on outfall 001. EDCC claims Lake Killdeer is heated from solar radiation, the same as POTW lagoons which don't have a

- temperature requirem[illegible] *However, EDCC has processes which introd[illegible] heat to their wastewater, as documented in the Woodward-Clyde report. Note that the Woodward-Clyde study shows waste streams in excess of 100 degrees F (third street sump) and 140 degrees F (nitrate area). This study was done in February, one could expect temperatures to be higher in summer.*

- Items 59 and 60, page26. Refers to the permit requiring an instantaneous D.O. limit. EDCC says since the model was based on average, the D.O. should be a monthly average. *However, the model was based on instantaneous conditions. The D.O. limits are necessary to maintain the D.O. standard in the receiving stream.*

LATEST PERMIT, May 31, 2002

Response to Comments

- Issue #1 EDCC requested an extension to the comment period to do clean sampling for metals instead of having metals limits in the permit.
  Response#1 states that a reopener clause has been added. If EDCC can demonstrate with clean sampling techniques that the potential to exceed water quality based metals limits will not be exceeded, permit can be reopened and modified. *Seems reasonable to me.*

- Issue #3 EDCC stated that during a meeting on Aug 29, 2001 ADEQ proposed to issue a draft/final permit that included a three year implementation plan.
  Response#3: States that only WQS based limits can have a three year compliance date from the effective date of the permit. States that all Technology based limits must be implemented at the effective date of the permit. The response refers to the applicable regulatory sections. ***What about making all the limits water quality based, with a three year compliance time frame. Possible?***

- Issue #4 EDCC re: outfall 001 has (1) requested that technology based effluent limits be given credit under the ammonia nitrate subcategory, since the facility does not have a "totally condensing overhead system" (originally said they did) and (2) State they have a significant source of nitrate and ammonia into outfall 001. The source is ppt. runoff which falls outside the "battery" area. EDCC has requested that under authority of 403.6(e) (which are for pretreatment standards to POTW's) ammonia and nitrate loadings for these areas should be added to the permit. *Note that 403.6(e) is for pretreatment std's to potws, and that in the end, water quality based limits would control. Of course, they would have a three year time frame to get into compliance. In the interim, the permit has interim maximum limits for ammonia of 31.9 mg/l. The WQS based ammonia limit, monthly avg, is 12 mg/l as opposed to the Technology based limit, which is 10.4 mg/l. Not a big difference. The technology based nitrate limit, mthly avg., is 19.8 mg/l.*
  Response to Issue#4 (2) is that no applicable NPDES effluent guidelines exist. *This seems to be the case since 403.6(e) is for pretreatment standards for industrial discharges to POTWs.*

- Issue #5: EDCC could not recreate the metals data used in the fact sheet used to determine the limits for outfall 001. EDCC requested that the process used be given.
  Response to issue #5: Goes through a step by step example of how the limits were derived. *This should suffice as adequate explanation.*

- Issue#6: EDCC : Draft permit failed to consider the use of seasonal designated use and critical flow in screening for and the development of effluent limits to protect aquatic life criteria and WET limits. Requested that all aquatic life criteria for 001 be reassessed.
  Response to Issue#6: Since flow is greater than 1 cfs (2.86 cfs) the perennial designated use must apply. *Note that the receiving stream has enduring pools, and would be expected to have a perennial population of fish.*

- Issue#7: Requests that temperature be removed from final permit.
  Response: Disagree since the facility discharges boiler blowdown, cooling towers, etc. therefore, temp limit

is necessary. *Note tha[illegible]e Woodward-Clyde study shows waste stream[illegible] excess of 100 degrees F (third street sump) and 140 degrees F (nitrate area). This study was done in February, one could expect temperatures to be higher in summer.*

- Issue#8: Requests the current monthly avg for dissolved oxygen instead of instantaneous be retained in the final permit.
  Response: No, instantaneous is consistent with other permits.

- Issue#9: Permittee has requested that mass-limits for TSS be deleted,
  Response: Mass based effluent limits are required by NPDES regulations at 40 CFR 122.45(f).

- Issue#10: Permittee requested sampling frequencies as follows: WET - Qtrly; Dissolved Minerals - Mthly; pH - Mthly.
  Response: Disagrees but allows a reopener clause for dissolved minerals and pH after two years. *Note that 7/31/2002 letter allowed the sampling frequency for dissolved minerals change from 3/week to 1/month. This letter also states that metals testing frequency can be reduced after a two year period without violations to once per quarter.*

- Issue#11: Permittee requested that mass limits for minerals be removed.
  The letter of 7/31/2002 eliminates the requirement for mass limits for minerals.

- Issue#12: Permittee requests that the pH excursion language be retained in the final permit.
  Response: Staff disagrees. Says pH limits are based on WQS, and that WQS do not allow for pH excursion.

- Issue#16: Permittee requests that chronic biomonitoring for 002 be changed to acute.
  Response: Disagree. States that since outfall will be same as receiving stream when discharging (overflow) that chronic is appropriate. *Also the receiving stream has enduring pools.*

  Issue#17: EDCC requests that monitoring frequency for 002 for WQS based limits and toxicity be reduced to 1/qtr and grabs.
  Response: Staff disagrees but adds a reopener. If EDCC can comply, then monitoring frequency can be reduced.

- Issue#18: For outfall 002 EDCC requests that dissolved mineral effluent limits be reported instead of actual limits imposed
  Response: Staff disagrees since water in the outfall will be the same as the receiving stream.

- Issue#23: EDCC wants credit for runoff from areas outside the battery on outfalls 010 and 011 (same as Issue#4 above)
  Response: Same as in response #4 above.

- Issue#24: For outfall 010 or 011 EDCC wants the WET limit be deleted from the final permit.
  Response: Staff disagrees, since the outfall is toxic, ADEQ is required under 40 CFR Part 122.44(d)(1) to address this in the permit. Staff added a reopener, if EDCC can comply for two years then monitoring frequency for WET limits can be reduced.

- Issue#25: Requests that "outfall sum" be deleted.
  Response: Disagree. See response

- Issue#26: Citizens concerned about chemicals in air and water.
  Response: Added ammonia and nitrate reporting requirements to biomonitoring conditions. Added a schedule of compliance for the one acre and fifty acre ponds to be sealed as soon as possible but no later than three years from the effective date of the permit.

Optional NPDES Permit Rating Worksheet
Alternate Wasteload/Stream Flow Ratio Criteria

NPDES No. AR0000752

Total Wastewater Flow 1.1MGD (mgd)

Type Wastewater Flow (I, II, or III) II

Stream flow (7-day low flow occurring once in 10 years)
0 (cfs) 0 (mgd)

Wastewater flow / stream flow ratio 100%

Determine the above data from the NPDES permit rating worksheet and from the stream data. Compute the wastewater flow/stream flow ratio. Check the appropriate blank below, record in the code checked in the code box and record the points checked in the Alternate Code an Alternate Points blank. Then transfer the Alternate Code and Alternate Points to page 2 of the NPDES Permit Rating Worksheet.

Wastewater Type:

Type I or III

41 ____	Flow <1 mgd	(00 points)
42 ____	Flow >1 mgd and 10% of receiving water low flow	(10 points)
43 ____	Flow >1 mgd and >50% of receiving water low flow	(20 points)

Type II

51 ____	Flow <0.5 mgd	(00 points)
52 ____	Flow >0.5 mgd and 10% of receiving water low flow	(20 points)
53 X	Flow >0.5 mgd and >50% of receiving water low flow	(30 points)

___ Alternate Code Checked

30 Alternate Points

NPDES PERMIT RATING WORKSHEET

NPDES No. AR0000752

Facility Name El Dorado

City El Dorado

Receiving Water unnamed Tributary of Flat Creek

Segment (If Designated) ______

X Water Quality Limiting

____ In Compliance With Water Quality Standards

____ Public Water Supply

Current Classification Status [1] ____ Major [2] ____ Minor [ ] Status Code

1. Toxic Pollutant Potential

PCS SIC Code 2823 Primary SIC Code 2819

Other SIC Codes [ ] [ ] [ ]

Industrial Subcategory Used ______

Industrial Subcategory Code [ ] (Code 00 if no subcategory)

Toxicity Group =

1	____	I	(00 points)
2	X	II	(10 points)
3	____	III	(20 points)
4	____	IV	(30 points)
5	____	V	(40 points)
6	____	VI	(50 points)

Toxic Pollutant Points = 10

[ ] Toxicity Group Code

2. Flow/Streamflow Volume

Wastewater Type

Type I

11	____	Flow <5 mgd	(00 points)
12	____	Flow 5 to 10 mgd	(10 points)
13	____	Flow >10 to 50 mgd	(20 points)
14	____	Flow >50 mgd	(30 points)

Type II

21	____	Flow <1 mgd	(10 points)
22	____	Flow 1 to 5 mgd	(20 points)
23	____	Flow >5 to 10 mgd	(30 points)
24	____	Flow >10 mgd	(50 points)

Type III

31	____	Flow <1 mgd	(00 points)
32	____	Flow 1 to 5 mgd	(10 points)
33	____	Flow >5 to 10 mgd	(20 points)
34	____	Flow >10 mgd	(30 points)

Flow Points = ______

[ ] Flow Code Checked

Alternate - Wastewater/Stream Flow Ratio

[ ] Alternate Code Checked on Optional Worksheet
(Code 99 if not used)

Alternate Points = ________

Wastewater Flow Points (Larger of Flow Points or Alternate) = 30

3. Traditional Pollutants

BOD or ________ *

Daily Average Load =

1	______	<100 lb/day	(00 points)
2	______	100 to 1000 lb/day	(10 points)
3	______	>1000 to 3000 lb/day	(20 points)
4	______	>3000 lb/day	(30 points)

[ ] BOD Code

COD

Daily Average Load =

1	______	<100 lb/day	(00 points)
2	______	100 to 1000 lb/day	(10 points)
3	______	>1000 to 5000 lb/day	(20 points)
4	______	>5000 lb/day	(30 points)

[ ] COD Code

Oxygen Demand Points (Larger of BOD or COD Points) = ________

* Insert any alternate oxygen demand parameter used.

TSS

Daily Average Load =

1	______	<100 lb/day	(00 points)
2	X	100 to 1000 lb/day	(10 points)
3	______	>1000 to 5000 lb/day	(20 points)
4	______	>5000 lb/day	(30 points)

TSS Points = 10

[ ] TSS Code

Ammonia or ________ **

Daily Average Load =
(As NH_4-N)

1	______	<300 lb/day	(00 points)
2	______	300 to 1000 lb/day	(10 points)
3	X	>1000 to 3000 lb/day	(20 points)
4	______	>3000 lb/day	(30 points)

Ammonia Points = ~~20~~ 0

[ ] Ammonia Code

** Insert any alternate nitrogen parameter used

Temperature (Heat

(Compute only for flows >10 mgd and when temperature limits specified in the permit).

[0] ____ Not Computed

Temperature Differential (ΔT) = Permit Limit (Max. Temp.) - 70°

Heat Load = Cooling Water Flow (mgd) x ΔT x 0.00834

= ________ x ________ x 0.00834 = ________ billion BTU

Heat Load = [1] ________ <4 billion BTU (00 points)
[2] ________ 4 to 10 billion BTU (10 points)
[3] ________ >10 billion BTU (20 points)

Heat Load Points = ______

[ ] Heat Load Code

Total Traditional Pollutant Points = 30
(Sum of Oxygen Demand, TSS, Ammonia and Heat Load Points)

4. Potential Public Health Impacts

Is the receiving water to which wastewater is discharged or a water body to which it is tributary used for a municipal water supply within 50 miles downstream?

[1] ___X___ No (0 points)
[2] ______ Yes

Toxicity Group
______ I, II or III (00 points)
______ IV (10 points)
______ V (20 points)
______ VI (30 points)

Public Health Points = ______

[ ] Public Health Code

5. Water Quality Factors

Have (or will) one or more of the effluent limitations assigned to the discharge been based on water quality factors in the receiving stream rather than technology or effluent guidelines or has a waste load allocation been assigned to the discharge? Alternately, has the receiving water been designated as water quality limiting?

[1] ___X___ Yes (15 points)
[2] ______ No (00 points)

[ ] Water Quality Limiting Code

Is the receiving water in compliance with applicable water quality standards?

Sulfatos

[1] ______ Yes (00 points)
[2] __X__ No (10 points)

[ ] Water Quality Standards Code

Total Water Quality Points = ______
(Sum of Water Quality Limiting and Water Quality Standards Points)

6. Total Permit Rating Points

Add Toxic Pollutant Points + Wastewater Flow Points + Traditional Pollutant Points + Public Health Points + Water Quality Points

Total Rating Points Assigned to the Permit = [95]

7. Processing Record

PCS information recorded by ______________ Date ________

Permit application data recorded by ________ Date ________

Permit data recorded by ______________ Date ________

Public water supply determination by ________ Date ________

Water quality determination by ________ Date ________

Coding entered in the computer by ________ Date ________

Errors revised by ______________ Date ________

Corrected coding in computer by ________ Date ________

EL DORADO CHEMICAL WASTEWATER TREATMENT PLANT

Process Description

Attachment I is a schematic diagram of the wastewater treatment plant as it will exist following the installation of the new nitric acid plant and new ammonium nitrate plant.

Water used in the plant is produced from wells on El Dorado Chemical property. Fresh water is used for cooling tower make-up, hydrostatic testing, pump seal flush, boiler feed water and unit washdown. These operations produce wastewater as cooling tower blowdown, pump seal flush, boiler blowdown, water softener regeneration backwash, unit washdown wastewater, and excess process steam condensate.

The plant wastewater discharge is permitted under NPDES permit #AR0000752. Three separate outfalls are regulated under this permit: process wastewater Outfall 001, stormwater Outfall 002, and sanitary Outfall 003.

Wastewater from the acids manufacturing area flows through a limestone neutralization pit, thence to the day pond (Lake Lee - 2 million gallons capacity). All other process wastewaters flow directly to Lake Lee. All of the process area wastewaters are mixed in Lake Lee where pH and flow are monitored. Here pH is corrected if necessary and wastewater then flows by gravity to Lake Killdeer, the seasonal impoundment pond. From Lake Killdeer (152 million gallons capacity), wastewater flows by gravity to be discharged to the receiving stream as NPDES Outfall 001. The large size of this pond allows for the storage of the wastewaters during high production periods as dictated by the fertilizer industry requirements. By so doing, the plant is able to discharge at a reasonably constant rate throughout the year.

Stormwater flows normally are treated with the process waste; however, during periods of extreme rainfall, the quantity of stormwater in excess of the capability of the treatment plant is bypassed and discharged to the receiving stream as Outfall 002. Sanitary wastewater is treated in a separate Imhoff system. This wastewater is then discharged into the receiving stream under Outfall 003.

PROCESS DESCRIPTION

The process units being permitted under this application are for the manufacture of nitric acid and ammonium nitrate respectively. A brief description of each process is provided, followed by detailed process and equipment descriptions.

The current synthesis for nitric acid has been practiced from the 1930's until the present day with very little modification during the last 10-15 years. The raw materials are ammonia vapor and air. The basic conversion of ammonia to nitric acid is achieved by compressing and heating a mixture of ammonia and air in the correct proportions and passing this mixture over a platinum catalyst where the ammonia is oxidized to nitrogen oxide. Upon absorption in water, nitric acid is formed. The nitric acid can be used as is in the manufacture of ammonium nitrate or concentrated for direct sale.

Ammonium nitrate is formed as the neutralization or reaction product of nitric acid and ammonia. This is accomplished by simply mixing the two raw materials in the correct proportions in a vessel, and using the heat of reaction to assist in driving off the water which accompanied the nitric acid. The ammonium nitrate product is handled in a molten state and normally finished in a prilling operation.

NITRIC ACID

DETAILED PROCESS DESCRIPTION

Refer to drawing # 205-110, "350 STPD NITRIC ACID PLANT - Process flow diagram", for this detailed process description of the nitric acid unit. Ambient air (1) is drawn into the unit through a set of filters [101] by the air compresser [102A]. The air (2) is compressed to approximately 120 psig. The air compressor [102A] is driven by a 'tail gas expander turbine' [102B] in conjunction with a steam turbine [102C]. The compressed air (3) is passed through a discharge filter [106] and then through an air heater [110] where the temperature is raised to 400 Deg. F. The hot/clear air (4) is now ready to enter the mixer [111].

Concurrently, liquid ammonia (20)is obtained from the ammonia pipeline via intermediate storage and pumped through a set of filters [109 B&C] into an ammonia vaporizer [107], where the liquid ammonia is heated and changed into ammonia vapor (25). The ammonia vapor is fed into an ammonia scrubber [107C] which is a packed distillation column. The ammonia vapor which goes overhead (28) is partially condensed in condenser [107A] and the liquid portion (29) is divided. Part of the liquid ammonia is directed back into the top of the distillation column as reflux ((29) - (30)) and the remaining (30) is directed to a reboiler [107D] to be revaporized and fed back into (27) the distillution column

[107C]. A stream of liquid ammonia (23) containing any impurities is diverted to the ammonium nitrate plant as feedstock. The purified ammonia vapor (21) is passed through a magnetic filter [109A] to remove any iron residues and then through an ammonia filter [109] to remove any remaining particulates. The clean ammonia vapor is directed through an ammonia super heater [108] and heated to 330 Deg. F. Then the hot clean ammonia (22) is directed into the ammonia/air mixer [111] where it is throughly mixed with the hot air stream (4). The mixed air/ammonia stream passes into the converter section [112] where process of converting/oxidizing the ammonia to nitric oxide begins. The reaction chemistry is:

$$NH3 + 2O2 \xrightarrow[\text{excess}]{\text{(Cat)}} \underset{(g)}{HN03} + \underset{(Vap)}{H20}$$

The nitrogen component of the air stream along with the unused O2 and trace elements pass through the process and along with a small amount of NOx become tail gas (16).

From the converter [111], gases pass through the converter elbow [112] into a series of heat recovery units:

A. The first of these is the expander gas heater [113], where the tail gas (13) (called expander gas or expander gas feed) is heated from 627 Deg. F. to 1163 Deg. F. and the reaction gases are cooled enough to pass into the waste heat boiler without causing corrosion/errosion problems.

B. From the expander gas heater [113] the reaction gases flow through the waste heat boiler [114], they are further cooled

and thereby generate enough steam to drive the air compressor steam turbine [107C] and have about 16,000 #1 hr. left over for export.

C. From the waste heat boiler [114] the reaction gases flow through the tail gas heater [113] where the tail gas stream (12) is heated from 168 Deg. F. to 627 Deg. F. and assumes a new identity 'expander gas' (13).

D. The final element in this train is a platinum filter [125] which is used to intercept any platinum catalyst which is worn off of the catalyst bed in the converter section [111/112].

E. As the reaction gas stream (6) leaves the platinum filter [125] it is directed through the low pressure waste heat boiler [117] where it is cooled from 399 Deg. F. to 278 Deg. F. and thereby generates 20# steam for use in the unit.

F. The reaction gas steam (7) exits the LP waste heat boiler and is directed through a heat exchanger "cooler condenser" [116] where the temperature is reduced from 278 Deg. F. to 116 Deg. F. using cooling tower water. From the cooler condenser [116] the reaction stream (8) enters the absorption tower. In this unit (12' dia. by 156' tall) the NO2 is absorbed into condensate (32) (ie, very clean water) and exists as nitric acid (9). This part of the process is rather easier to describe than to accomplish as a review of the process flow diagram reveals. The efficiency of this step determines the amount of NOx which is ultimately discharged to the environment. From the top of the absorber column the reaction gas stream (11) becomes "tail/expander gas" and is directed through a mist eliminator [119] and to a tail gas preheater which receives its steam from the low pressure waste heat boiler. The tail gas is heated from 75 Deg. F. to 168 Deg. F. From the preheat [119] the tail gas stream (12) flows through the tail gas heater [115] and assumes a new identity (13) as expander gas. This stream (13) flows through the expander gas heater [113] and emerges (14) which is intersected by stream (18). Stream (18) is about 25% of the inlet compressed air and this mating serves two purposes. First, the expander gas is cooled slightly to avoid metallurgical problems in the expander turbine [102B] and second, by adding dry air the relative humidity is maintained high enough that water does not condense out in the expander turbine [102B]. Even a small amount of free water in this type of equipment can cause catastrophic failure. From the exit from the tail gas expander [102B] the tail gas (15) flows through two economizers [139A] and [139B]. As the exit stream (16) discharges into the atmosphere via a stack [121] 50' above the surface.

NITRIC ACID PLANT EFFLUENTS

See drawing 205-120 Rev. 0 attached.

The discharge points for the nitric acid plant are described as follows:

A. Tail gas startup/emergency vent [155] located just before the tail gas expander on stream (14). This stack is utilized only during startups and emergency shut downs to prevent any liquid carryover from entering the tail gas expander [102A]. The NOx discharges from this stack will seldom, if ever, exceed the permitted allowance.

B. Discharge point "B" is the sump for the boiler blowdown system and will flow about 1200 gallons per day. This stream discharge into the El Dorado Chemical Company's process sewer and utlimately out source 001.

C. Stream (16) is the tail gas vent stack which discharges the nitrogen, excess oxygen, unabsorbed NOx and trace elements via a 50' stack. This stack will exceed the permit allowance for NOx only as a result of a major process upset. Such upset would be expected to occur only about once each year and be of very short duration.

POLLUTION CONTROL DEVICES

The critical (and only significant) pollution control device on any nitric acid plant is the absorber [118]. The amount of NOx in the tail gas discharge stream is a direct function of the efficiency of the absorber. If the absorber has been correctly designed, carefully maintained, and properly operated, the NOx emissions from the nitric acid plant should not exceed about 3 # per ton of nitric acid produced. This is very close to the theoretical limit and represents the Best Available Technology

(BAT) criteria. The subject plant for this permit was in service in Missouri, and successfully met BAT standards for NOx emissions. No reason exists to preclude the plant from meeting the BAT NOx emission limit of 3 #/ton in Arkansas.

DETAILED PROCESS DESCRIPTION AMMONIUM NITRATE PLANT

Refer to drawing #C.P.-201 and C.P.-202 for the following description.

Nitric acid from the nitric acid plant via intermediate storage is pumped into the process (2) and into (34) the nitric acid preheater [12E-103] where it is heated with AN (Ammonium Nitrate) steam (also called chemical steam) (8) from 100 Deg. F. to 145 Deg. F. From the preheater [12E-103] the nitric acid flows to the neutralizer vessel [12G-101].

Concurrently ammonia liquid is pumped from the ammonia pipeline via intermediate storage (and seasonably some ammonia vapor from the unit) into the process (1). The ammonia liquid flows in to (35) & (4) two ammonia vaporizers [E12-101 & E12-1101] where the ammonia is converted into a vapor and heated from 35 Deg. F. to 120 Deg. F. The ammonia vapor then flows to an ammonia superheater [12E-101C] and then to a mist eliminator vessel [12G-105] and on into the neutralizer vessel [12G-101]. The heat source for the vaporization and super heating is AN steam (7) (11) (13) from the neutralizer.

The neutralize vessel [12G-101] is the heart of the ammonium nitrate process. In this vessel the nitric acid and ammonia vapor mix and react chemically forming ammonium nitrate. The reaction of this strong acid (nitric acid) with this strong base (ammonia) is very exothermic (heat producing) and this heat of reaction is used to boil off the majority of the excess water. The water exists because nitric acid is about 1/2 acid and 1/2 water as it enters the process (2).

The neutralizer is supplied with a flow ratio system which proportions ammonia vapor flow at a fixed ratio to the measured nitric acid flow to the unit. A pH controller is also provided to measure the pH leaving the Neutralizer and add ammonia as necessary to maintain the desired acidity.

As part of a previous revamp, a contiuously operating recycle line has been provided from the AN Pump (12J-101 A/B) discharge to the AN Pump Tank (12G-103). Recycled nitrate will discharge through an educator in the tank to thoroughly mix the tank contents to provide rapid indication of changes in the Neutralizer concentration. A sample of nitrate solution will flow from this line through a mixing tee, (where it will be diluted with steam condensate at 50 psig), to a cooler, before flowing to the pH element. The hot steam condensate used for dilution will be supplied from the Steam Condensate Flash Tank (12G-1107) through a flow control valve FCV-1113. Flow of ammonium nitrate to the mixing tee will be adjusted to maintain a reading on the dilute solution flow meter (F1-1111) corresponding to approximately 25% more flow than on the condensate control valve. The temperature of the solution as shown on T1-1111 must be below 180 Deg. F. To avoid flashing in the condensate flow

control valve, and to insure that the solution temperature remains high until dilution, the outlet globe valve of the sampling system should maintain a back pressure of about 40 psig. Flow of diluted solution to the pH element itself can be adjusted by a needle valve to maintain a steady flow to the outlet funnel.

The major flow of ammonia to the Neutralizer will continue to be controlled by FAC-2 which is automatically reset to maintain the desired ratio to the nitric acid flow measured on FRC-1. The ammonia vapor flow element and control valve (FE-2006, FV-2006) have been replaced for the increased capacity so new correction factors for the flow recorder must be used.

The pH Controller will regulate a small flow of ammonia vapor to the Neutralizer through valve pH CV-1 as a fine adjustment. The Controller will be set to maintain a slight excess of acid in the Neutralizer (a pH of approximately 2.0) in order to minimize ammonia loss. As has been the practice, ammonia will be bled continuously into the nitrate line feeding the Dehydrator to neutralize the excess acid. In addition, liquid ammonia will be fed directly into the head tank through the existing control valve (pH CV2-1) by the new remote manual controller HC-3003 to maintain pH of the prilling solution at 5 to 6.

The water vapor exits the top of the neutralization vessel [12G-101] and a controlled amount of AN (ammonium nitrate) condensate (17) and nitric acid is added to slightly cool (de-superheat) the vapor and maintain the pH below 7 to minimize the ammonia losses. The vapor is directed into the neutralizer overhead scrubber

[12G-1102] vessel where a stream (16) of dilute ammonium nitrate removes the majority of the ammonium nitrate which was carried out of the neutralizer vessel [12G-101] with the vapor stream. The AN vapor stream (14) then flows to the various users. The excess AN vapor flows (10) to the surface condenser [12E-104] where it is condensed. The surface condenser [12E-104] condensate along with the condensate from the other AN steam users flows to the AN condensate collection tank [12G-106]. A careful examination of Drawings CP-201 and CP-202 reveal a number of uses (ie, streams (30), (26), (24), (20), (27), for the AN Condensate, and ultimately all of this recycle AN Condensate is returned to the neutralization vessel [12G-101] and then proceeds around the loop again as AN steam vapor. By design, approximately 24,000 gallons/day of AN condensate containing 120# of NO3 nitrogen and 600# of NH3 nitrogen will be discharged to the plant process sewer.

The ammonium nitrate leaves the neutralizer [12G-101] and flows into a pump tank [12G-103]. The ammonium nitrate stream (3) at this stage is about 94.7% ammonium nitrate and 5.3% water, and is in molten form.

The ammonium nitrate must be about 99.7% pure prior to prilling, and to achieve this, the ammonium nitrate (25) is pumped [12J-101 A/B] to the ammonium nitrate dehydrator [12E-1201], where heated air is blown through the solution to remove the excess water. The dehydrator [12E-1201] exhaust air stream (37) is directed to the Brink Scrubber for clean-up prior to discharge to the atmosphere. The dehydrated ammonium nitrate stream (25) flows to a head tank [G-201] prior to prilling.

Ammonium nitrate is traditionally sold in prilled form and the prilling operation is carried out in a prilling tower [R-201]. The prilling operation is accomplished by dispersing the almost anhydrous (dry) ammonium nitrate solution (25) by means of a spray nozzle or "prill plate" downward in the prill tower [R-201]. At the same time a set of fans [K-201 A,B,C,&D] are employed to draw upward through the tower [R-201] a large quantity of air, which serves to cool and solidify the ammonium nitrate droplets into solid prills or beads. Because the spraying or dispersing operation causes the generation of a certain amount of very fine particles (all mist appears to be smoke) approximately 25% of the cooling air is carefully drawn out of the prill tower [R-201] and directed to the Brink Scrubber [L-102]. The remainder of the cooling air is discharged directly to the atmosphere from the fans [K-201 A,B,C & D].

The solid prills or beads fall by gravity out of the bottom of the prill tower [R-201] directly on to the prill collecting conveyor [O-201] which carries or conveys them to the predryer [R-202]. Although the prills at this point contain very little moisture, it is necessary to dry them completely, because most of the low density ammonium nitrate is intended for commercial blasting use, and any trace of moisture is detrimental. The air for the predryer [R-202] is heated using AN steam in heater [E-205] with the AN condensate being returned to the [2G-106] AN

Condensate collection tank. The exhaust air stream from the predryer [R-202] is drawn by fan [K-203] from the predryer [R-202] and blown through a wet scrubber [R-206]. The scrubber [R-206] discharges (40) to the atmosphere. The scrubbing liquid circulates around the scrubber [R-206] from a circulation tank [G-207] via a pump [J-202 A/B]. To increase the efficiency of this scrubber, some of the scrubbing solution is injected into the fan [K-203].

The predried ammonium nitrate prills exit the predryer [R-202] onto conveyor [0-202] and are transported to the dryer [R-203]. The air for this dryer [R-203] is heated in heater [E-206] again using AN steam. The AN Condensate from this heater [E-206] is returned to the AN Condensate tank [12G-106]. The exhaust air is drawn from the dryer [R-203] by fan [K-204] and blown into scrubbers [R-207]. The wet scrubber [R-207] discharges (42) directly to the atmosphere. The scrubbing solution for this scrubber [R-207] circulates around the scrubber [R-207] from the circulation tank [G-207] via pumps [J-202 A/B]. To increase the efficiency of this srubber [R-207] some of the scrubbing solution is injected into the fan [K-204]. The scrubbing solution (20) is made up of dilute ammonium nitrate solution from the ammonium nitrate pump tank [12G-103] pH control loop discharge. The used scrubber solution (41) is pumped to one of the remelt tanks [G-202 or G-1202] for recycle.

The dried ammonium nitrate prills are discharged out of the dryer [R-203] onto the conveyor [0-203] and carried to the cooler [R-204]. The dried prills arrive at the cooler at about 190 Deg. F.

and must be cooled to under 90 Deg. F. for further processing and storage. The cooling air for the cooler [R-204] is drawn from ambient air in the winter and obtained from cooling coils [E-204 & E-203] in the summer and fall. The refrigeration is obtained by vaporizing liquid ammonia which is subsequentially used for feed (1) to the neutralizer [12-101].

The exhaust air is drawn from the cooler [R-204] by a combination of fans [K-203 and K-204] and forced through scrubbers [R-206 and R-207]. The operation of these scrubbers is as described previously.

The cool dry ammonium nitrate prills discharge from the cooler [R-204] on to conveyor [0-204] which carries the prills to elevator [0-205]. The prills are allowed to flow down on to the prill screen [R-210] where the fines are separated from the product stream and dumped into the remelt tanks [G-202 and 12G-1202]. The remelt tanks serve as a means of providing the highest possible concentration of ammonium nitrate to be recycled to the neutralizer. The obvious objective of the recycle system is to convert the largest possible amount of by product into soluble material with the lowest possible cost and emissions.

The product ammonium nitrate prill stream exits the screen [R-210] and in the subject case of low density ammonium nitrate, the product is transferred to storage to await shipping.

AMMONIUM NITRATE PLANT EFFLUENTS

The discharge points for the ammonium nitrate plant are described as follows:

A. The ammonium nitrate condensate tank [12G-106] and pump [12J-102]. This plant is designed to totaly condense the water vapor from the neutralizer. This type of design greatly reduces the overall emissions and air emissions in particular but it does create stream (18) which contains 30+ lbs/hour NH3 and NO3 nitrates.

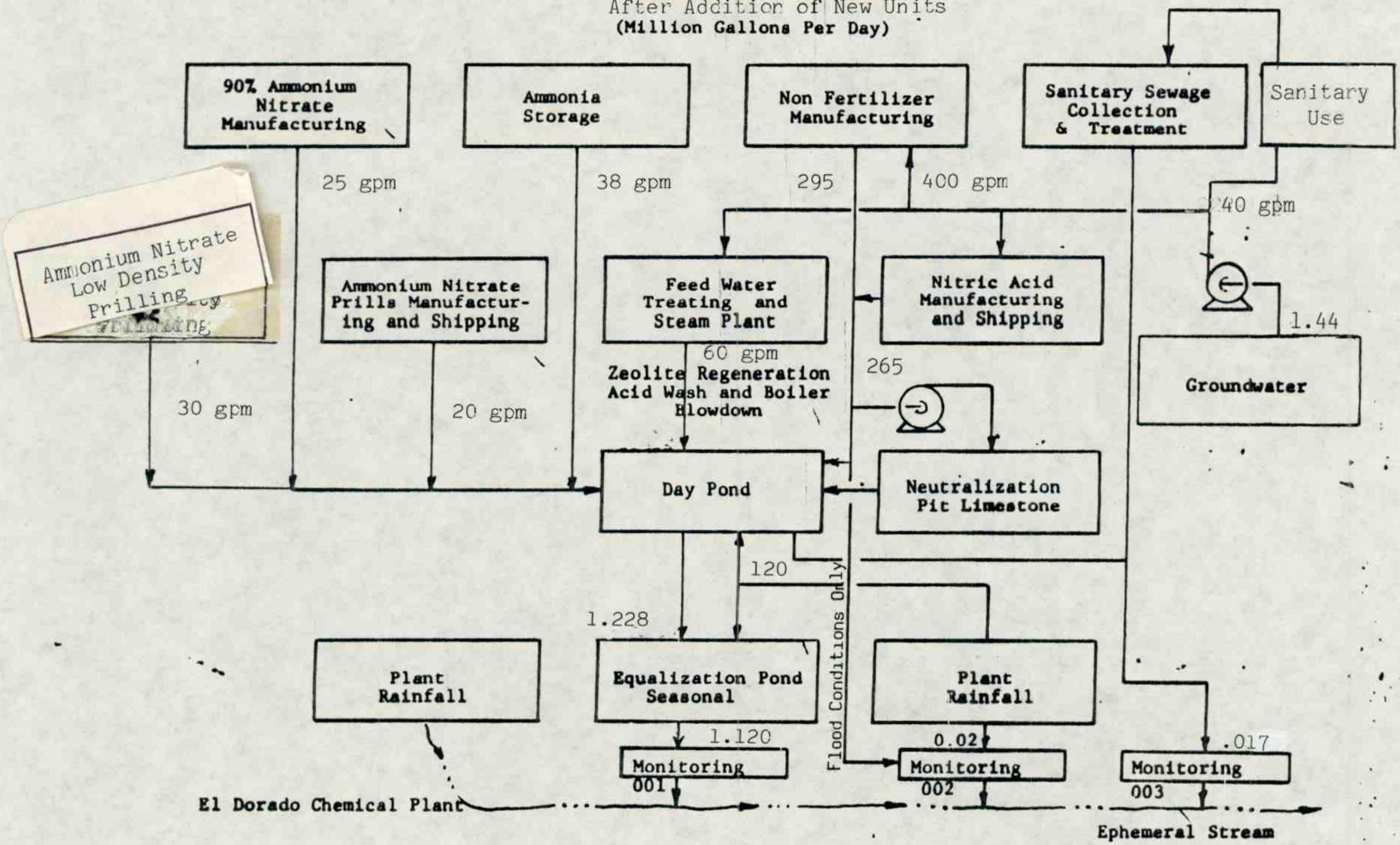
B. The prilling tower cooling air fans [K-102 A, B, C & D].

C. The Brink Scrubber is used to reduce and control the ammonium nitrate particulate emissions from the dehydration and prilling operation.

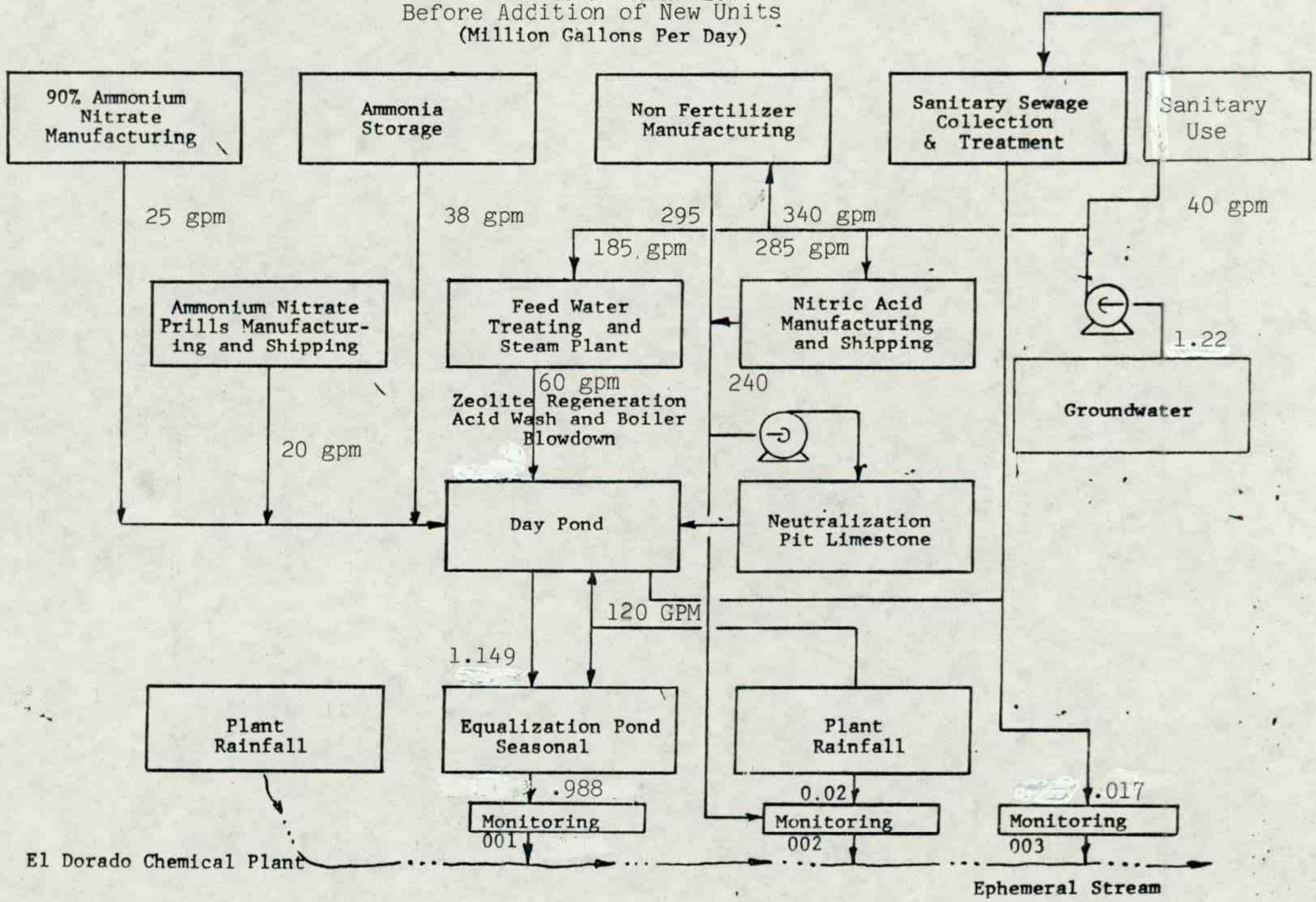
D. The predryer, dryer, and cooler wet scrubbers [R-206 & 207] are used to reduce and control the ammonium nitrate particulate emissions from the dryer train.

002 is not really stormwater. It is first pond (Lake Lee). process wastewater goes to prior to going to Lake Mildeer (001)

SCHEMATIC OF WATER FLOW
After Addition of New Units
(Million Gallons Per Day)



SCHEMATIC OF WATER FLOW
Before Addition of New Units
(Million Gallons Per Day)



ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

WATER QUALITY MANAGEMENT PLAN UPDATE

SUMMARY SHEET

Type of Discharge: Municipal ___, Industrial X , Other ________

Facility Name El Dorado Chemical Co.

Receiving Stream Unnamed tributary of Flat Creek

Segment 2D County Union

Permit No. AR 0000752 Update Method ________

Date ________ Flow 1.12 MGD

Critical Limits NH3-N/EFF. D.O. 14/4 June-Oct

Seasonal Limits NH3-N/EFF. D.O. 14/6 Nov-May

Justification Desk Top Model

Already included in WQMP Y/N Y

If Yes, list the information currently in the Plan:

Receiving Stream Same

Limits 0/0 BOD5/NH3-N

Section, Range & Township, or Latitude and Longitude

Existing ________

New Site ________

Water Quality Standards Change by Use Attainability Analysis Y/N N

If yes, list changes ________

DESK TOP MODEL
FOR THE EL DORADO CHEMICAL COMPANY PROCESS WATER
DISCHARGE TO UNNAMED TRIBUTARY OF FLAT CREEK

AUGUST 10, 1989

I. Introduction

A desk top model was performed on an unnamed tributary of Flat Creek, the current receiving stream of the El Dorado Chemical Company process water discharge, in order to determine the ammonia limits that will maintain the dissolved oxygen standard of this stream. The present treatment facility consists of a nitrification-denitrification process, with the water then entering a holding lagoon. The discharge is into the unnamed tributary in the SW 1/4 Section 7, Range 15 West, Township 17 South in Union County. El Dorado Chemical Company is currently operating under NPDES # AR0000752, which is being reviewed for renewal.

The present discharge site is located in planning segment 2D of the Ouachita River basin. The design flow of the present facility is 1.12 MGD (million gallons per day).

The unnamed tributary of Flat Creek, with a drainage area of one mi^2 at the discharge site, is classified as a Gulf Coastal mid-size watershed fishery as a result of the volume of discharge (exceeding 1 cfs), and as such, has an applicable dissolved oxygen standard of 3 mg/l, with a 1 mg/l diurnal fluctuation being allowed for not more than 8 hours in any 24 hour period, when the stream temperature exceeds 22°C. At stream temperatures of 22°C or less, a 5 mg/l dissolved oxygen standard applies to this stream.

The desk top model, utilizing the steady state Streeter-Phelps equation, was used to determine the effluent limits necessary to protect the dissolved oxygen standard in the receiving stream during both critical and primary season discharge periods.

II. Data Used in the Model

The input parameters used in the model for the El Dorado Chemical Company process water discharge are:

Q7-10 flow = 0 cfs
Stream depth = .75 feet
Stream velocity = .1 feet/second
Critical temperature = 28°C
Seasonal temperature = 22°C*
D.O. saturation = 75%**
*Upper temperature limit for fish spawn
**As determined by ecoregion studies

The reaeration rate, Ka, was calculated using the O'Connor-Dobbins formula:

$$Ka = \frac{12.9\,U^{.5}}{H^{1.5}}$$

where U = velocity, feet/second
H = stream depth, feet

This resulted in Ka of 6.3/day. The formula used is recommended in Appendix A of Technical Guidance Manual for Performing Wasteload Allocations.

The deoxygenation rate, Kd, used was 0.0/day, based on the absence of BOD in the process water.

The EPA accepted literature value of 0.4/day was used for the ammonia removal rate, Kn.

The benthal demand, B, used in the model was 0.3 gm/m²/day for the 14 mg/l NH3N projection into the receiving stream.

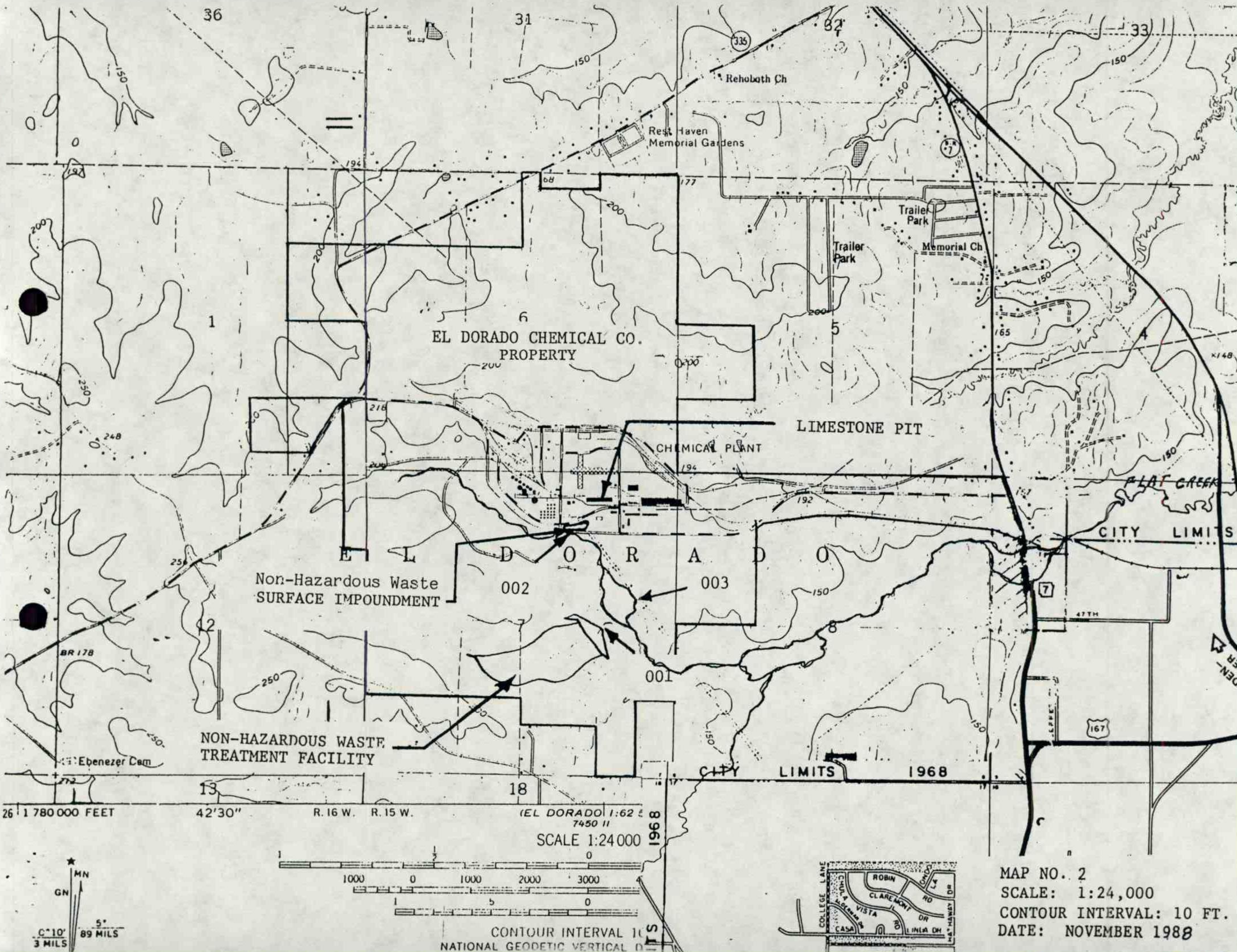
III. Results

The results of the computer runs applicable to the El Dorado Chemical Company process water discharge are tabulated below.

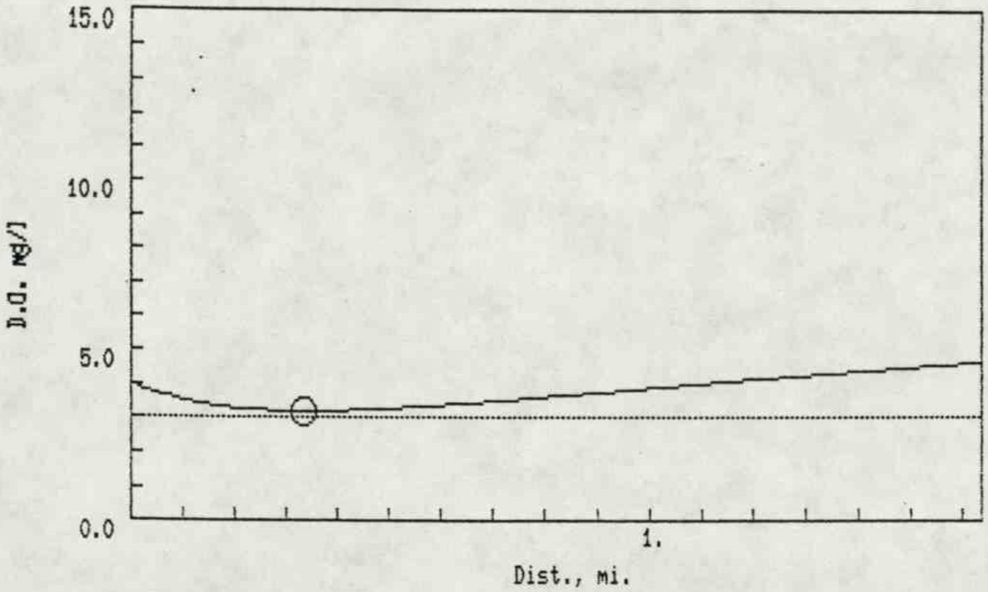
EFFLUENT LIMITS-MONTHS (NH3N/EFF.DO)	Qe MGD	Qs CFS	TEMP. C°	RECEIVING STREAM	D.O. (MG/L)
14/4--JUNE-OCT	1.12	0	28	UN. TRIB.	3.2
14/6--NOV-MAY	1.12	0	22	UN. TRIB.	4.8

IV. Recommendations

It is our recommendation that the El Dorado Chemical Company process water treatment facility discharge no more than 14 mg/l NH3N into the unnamed tributary of Flat Creek at any time during the year. An effluent dissolved oxygen of 4 mg/l is required during June through October, and 6 mg/l is required November through May in order to maintain the dissolved oxygen standard of this stream. The model input data and dissolved oxygen sag curves are attached.



MAP NO. 2
SCALE: 1:24,000
CONTOUR INTERVAL: 10 FT.
DATE: NOVEMBER 1988



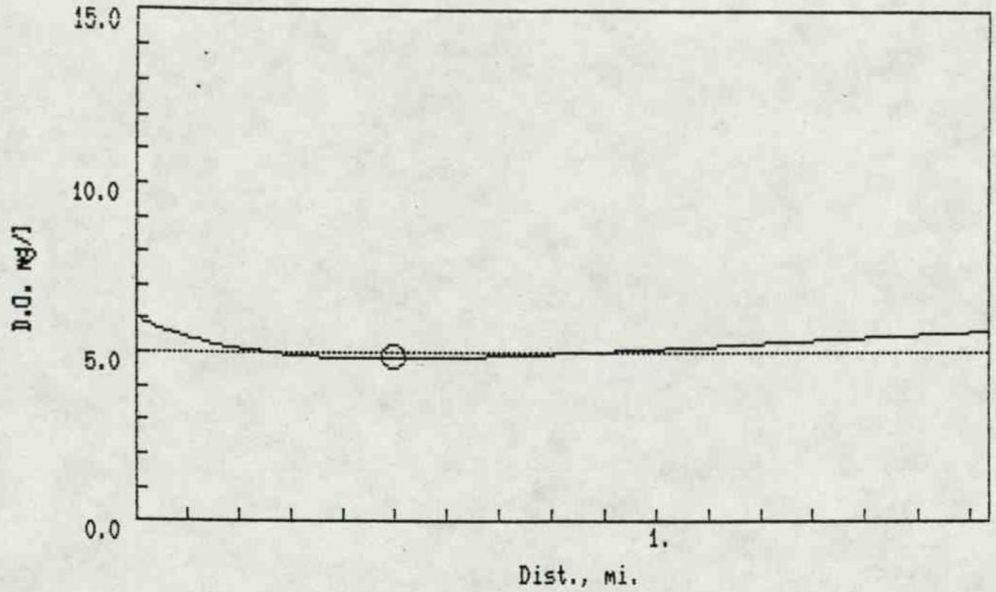
EL DORADO CHEMICAL 14 MG/L NH3N TO UN.TRIB.FLAT CR.
Date of this run: 08/10/89

Stream Temperature	=	28.0 deg C
Stream flow	=	0.00 cfs
Stream D.O.	=	0.0 mg/l
Stream UOD	=	0.0 mg/l
Stream Velocity	=	0.1 fps
Waste Temperature	=	28.0 deg C
Waste flow	=	1.20 mgd
Waste flow	=	1.9 cfs
Waste D.O.	=	4.0 mg/l
Waste BODU	=	0.0 mg/l
Benthal Demand	=	0.3 g/m**2/day
Mean Depth	=	0.8 ft.
S	=	1.3 g/m**3/day
S corrected	=	2.3 g/m**3/day
Ammonia_nitrogen	=	14.0 mg/l
NUOD	=	64.0 mg/l
Total UOD of waste	=	64.0 mg/l

Rate constants, per day, (base e)

Kd = 0.0	Kd corrected = 0.0
Ka = 6.3	Ka corrected = 7.6
Kn = 0.4	Kn corrected = 0.6

Temperature of MIX	=	28.0 deg C
UOD of mix	=	64.0 mg/l
D.O. of mix	=	4.0 mg/l
D.O. saturation	=	7.9 mg/l
Minimum D.O.	=	3.2 mg/l
Critical distance	=	0.3 miles



EL DORADO CHEMICAL 14 MG/L NH3N TO UN.TRIB.FLAT CR.
Date of this run: 08/10/89

Stream Temperature	=	22.0 deg C
Stream flow	=	0.00 cfs
Stream D.O.	=	0.0 mg/l
Stream UOD	=	0.0 mg/l
Stream Velocity	=	0.1 fps
Waste Temperature	=	22.0 deg C
Waste flow	=	1.20 mgd
Waste flow	=	1.9 cfs
Waste D.O.	=	6.0 mg/l
Waste BODU	=	0.0 mg/l
Benthal Demand	=	0.3 g/m**2/day
Mean Depth	=	0.8 ft.
S	=	1.3 g/m**3/day
S corrected	=	1.5 g/m**3/day
Ammonia_nitrogen	=	14.0 mg/l
NUOD	=	64.0 mg/l
Total UOD of waste	=	64.0 mg/l

Rate constants, per day, (base e)

Kd = 0.0	Kd corrected = 0.0
Ka = 6.3	Ka corrected = 6.6
Kn = 0.4	Kn corrected = 0.4

Temperature of MIX	=	22.0 deg C
UOD of mix	=	64.0 mg/l
D.O. of mix	=	6.0 mg/l
D.O. saturation	=	8.8 mg/l
Minimum D.O.	=	4.8 mg/l
Critical distance	=	0.5 miles

ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

MEMORANDUM

TO: Planning Branch
FROM: P. Murphy, NPDES Branch
DATE: 10-2-89
SUBJECT: Request for Desktop Model

1. The NPDES Branch is currently reviewing an application for Re (issuance, mod., etc.) of NPDES Permit No. AR000752.

2. The following information is provided:

   a. Type of discharge Sanitary (municipal, industrial, etc.).

   b. Name of Facility EDC.

   c. Description of treatment process:
      (1) existing Imhoff tank, SF.
      (2) proposed (if known) ______.

   d. Design Flow: 0.017 MGD e. Receiving Stream unnamed tribu. to Flat Creek

   f. Discharge Location: Provide either:
      (1) Lat: 33 18 22
      Long: 92 41 10
      or
      (2) Sec. ______ Range ______ Township ______

   g. Other information, as available:
      (1) wetted width ______
      (2) water depth ______
      (3) average velocities ______
      (4) substrate type ______
      (5) other (describe) ______

FROM: Planning Branch
TO: Phil

Effluent Limits: 10/15/5 May-Oct; 10/15/10 Nov-Apr

RTS 10/05/89

El Dorado Chemical 1/25/89

Jim Wanninger J.B. Cecil

Amer Cyanamid @ plant Hannibal Mo } NSPS Dick Mc

Nitric Acid + Nitrate

prod. incr at 3 ea for orsoc oper

dismantle & move

Lake Joe + Lake Killdeer — constr pond by

Oct 89 completed

May applic proposed by March 89

need to separately give prod. figs. for :

1) existing fac

2) new fac NSPS limi

✓ DMR data & pmt of ElDo facility

looks like pH is only } concern addressed

N.G.

Monsanto Chem Mar 76 McClel Engr Sheet 1 of 1

1A day pond

50A pol pond (fish live in)

look @ tl. load wrt WQ limits

67' 57, just went

look @ def of "New Sources"

fert + blasting

$HNO + NO_3$

+

NH_4NO_3

Permitting New Facilities
at El Dordo Chemical Company
El Dorado, AR

I. (a) New Acid Plant

Air - NSPS - 40 CFR 60 Sub-part G Standards of Performance for Nitric Acid Plants.

The plant will produce 350 T/D (expressed as 100%) of 63% Nitric Acid.

Three Lbs/ton of production (expressed as 100%) is allowed under the NSPS.

350 T/D ÷ 24 = 14.58 x 3 = 43.74 Lbs/Hr. allowed

Actual 36 Lbs/Hr. normal operation.

Air - PSD 40 CFR Parts 51 & 52, Revisions October 17, 1988. This plant was permitted in Missouri under EPA's PSD regulations in 1980. Background sampling done by the state around El Dorado and the ambient air monitoring done by TOSCO in years past indicated that the area meets SIP requirements. The acid plant is scheduled to be ready for start-up by the end of October and the prill plant by the end of the year. Since PSD regulations are still being promulgated, we would hope to be permitted under the present PSD regulations instead of those being proposed. At any rate, we need guidance from the state on this point.

(b) New Low Density Prill Plant

Air - 40 CFR 60 and as outlined in Section 7 of the Arkansas State Implementation Plan.

Sampling data collected when the prill plant was permitted in Missouri indicates that the emission rates fall well within the allowable emission rate. At such time that the plant is put on line, similar testing could be performed on the same emission points to verify the effectiveness of the pollution control equipment. A copy of the sampling data plus descriptions of the control equipment are attached in the information submitted by Mr. Brad Willett, Manager Environmental Services at the American Cyanamid Plant.

II.(a) New Acid Plant - 40 CFR 418.50 sub-part E

Water - The NPDES permit limitations on the plant as installed in MO were:

Ammonia Nitrogen	5.6 Lbs/day average
	56.0 Lbs/day maximum

Nitrate Nitrogen	16.1 Lbs/day average
	119.0 Lbs/day maximum

(b) New Low Density Prill Plant 40 CRF 418.42 Sub-part D

Water - The NPDES permit limitations were:

Ammonia Nitrogen	468 Lbs/day average
	876 Lbs/day maximum
Nitrate Nitrogen	444 Lbs/day average
	804 Lbs/day average

(c) Present Permit Limits 001

	Ammonia Nitrogen	197 Lbs/day average
		552 Lbs/day maximum
	Nitrate Nitrogen	575 Lbs/day average
		1375 Lbs/day maximum
Totals:	Ammonium Nitrogen	670.6 Lbs/day average
		1484 Lbs/day average
	Nitrate Nitrogen	1035.1 Lbs/day average
		2298 Lbs/day maximum

Our present wastewater treatment system consists of a neutralizing system, which involves addition of caustic to the acid plant's sewers and pumping the effluent through a limestone pit. Wastewater from the ammonium nitrate area and the acid plants plus operating area run off are directed to a one acre day pond (Lake Lee). From Lake Lee the water flows by gravity through an 18" pipe to Lake Killdeer which is a 50 acre lake capable of holding seasonal surges of rain and process water. Discharge from this lake is our NPDES 001 outfall. This outfall is shut down if the pH exceeds the limits of 6 to 9. The discharge is adjusted by valve to prevent exceedances of our Lbs/day maximum limits for any parameter and shut off when we reach the monthly average limit. We usually reach the monthly average limit for NO3-N or NH3-N in about 15 to 20 days and the effluent is closed for the rest of the month.

This mode of operation satisfies the permit conditions but has little consideration for the effect on the stream. The water in Lake Killdeer supports a thriving fish population (mostly carp) along with other wild life that inhibit the area. A permit based on ppm effluent with a maximum Lbs/day limit would allow continuous discharge and be much more beneficial to the receiving stream. Our permit is due for renewal at this time and El Dorado Chemical requests that these considerations be made a part of the permit application.

January 22, 1989

1 MG for 15 days & then N.D. for balance of month
unnamed trib Haynes Creeks.

EL Dorado Chemical Company

P. O. Box 231
El Dorado, Arkansas 71731

JAMES C.(JIM) WARNOCK

Environmental Coordinator 501-863-1482

CYANAMID

American Cyanamid Company
Agricultural Division
P.O. Box 817
Hannibal, MO 63401
(314) 769-2011

January 12, 1989

Mr. James C. Warnock
El Dorado Chemical Company
P. O. Box 231
El Dorado, Arkansas 71731

RE: Environmental Permits for Ammonium Nitrate and Weatherly Nitric Acid Plants

Dear Jim:

As you requested during your visit to our plant, I have assembled the following information regarding the environmental permitting and operating performance for the Hannibal Plant's ammonium nitrate and Weatherly nitric acid plants which your company has purchased. The information includes summaries of our existing environmental permits and related application information.

A. Ammonium Nitrate Plant

1. NPDES Wastewater Discharge Permit Limitations

Ammonia nitrogen	= 468 lbs/day	average
	876 lbs/day	maximum
Nitrate nitrogen	= 444 lbs/day	average
	804 lbs/day	maximum

These allowances were based on Best Engineering Judgment (BEJ) limitations. The basis was 40 CFR Part 418 - Fertilizer Manufacturing Point Source Category, Subpart D - Ammonium Nitrate Subcategory using best practicable control technology criteria. Production rate used as basis was 600 tons/day.

Please note, Section 418.40 excludes this plant from applicability of these regulations under "discharges from plants which totally condense their neutralizer overheads". For this reason we negotiated the application of BPT limitations with consideration for the fact that the plant effluent would not have an adverse impact on the receiving stream.

The plant has been able to achieve these permit limitations.

2. Air Permit Limitations

The original construction permit for this facility is not available in my archives. It appears that the original construction permit requirements involved minimal notification of intent to construct. Your company has our drawings on the Ammonium Nitrate Plant Process Flow Diagrams: C. P. - 201 and C.P.-202 which provide process and emission information.

The operating permit for air emissions for this facility required the demonstration that the total particulate emissions from the combination of the emissions from the four prill tower fans and the Brinks scrubber complied with Missouri Department of Natural Resources Air Pollution Control Regulations for particulate emissions. I have attached a copy of the applicable MDNR particulate emission regulations. I have also attached the results of our compliance testing report for this system which was conducted and approved by the MDNR in 1980.

B. Weatherly Nitric Acid Plant

1. NPDES Wastewater Discharge Permit Limitations

Ammonia nitrogen	=	5.6 lbs/day	average
		56.0 lbs/day	maximum
Nitrate nitrogen	=	16.1 lbs/ day	average
		119.0 lbs/day	maximum

These allowances were based on New Sources Performance Standards for nitric acid manufacturing facilities. The basis was 40 CFR Part 418 - Fertilizer Manufacturing Point Source Category, Subpart E - Nitric Acid Subcategory, Section 418.55 (b). Production rate used as basis was 350 tons/day.

2. Air Permit Limitations

The construction permit for this facility was issued finally under the EPA PSD (Prevention of Significant Deterioration) regulations. The plant was constructed and was operated in accordance with 40 CFR Part 60 - Standards of Performance for New Stationary Sources, Subpart G - Standards of Performance for Nitric Acid Plants.

I have attached a copy of the Weatherly Plant Process Flow Diagram showing gaseous effluents from the plant. Your company has the original drawing of this flow sheet in the drawings we provided during your visit to our plant.

The plant did comply with applicable air emission regulations.

This information should provide you with a basis for initiating permitting discussions with your regulatory agency. If you have any further questions, please contact me at 1-314-769-2011, Ext. 2268.

Yours truly,

AMERICAN CYANAMID COMPANY
Agricultural Division

J. Brad Willett, P.E.
Manager, Environmental Services

JBW:ms
MSENVD
Attachments

10 CSR 10-3.050 Restriction of Emission of Particulate Matter From Industrial Processes

PURPOSE: This regulation restricts the emission of particulate matter in the source gas of an operation or activity except where 10 CSR 10-3.040, 3.060 and/or 3.140 would be applied.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the rule has been filed with the secretary of state and summarized here by the agency adopting it. The entire text of the rule may be found at the office of the secretary of state or at the headquarters of the agency and is available to any interested person at a cost not more than the actual cost of reproduction.

(1) Application. This regulation shall apply throughout the state of Missouri except in the City of St. Louis, and St. Charles, St. Louis, Jefferson, Franklin, Clay, Cass, Buchanan, Ray, Jackson, Platte, and Greene counties.

(2) Definitions of terms specified in this rule may be found in 10 CSR 10-6.020.

(3) General Provisions

(A) This regulation applies to any operation, process, or activity except the burning of fuel for indirect heating in which the products of combustion do not come into direct contact with process materials and except the burning of refuse and except the processing of salvageable material by burning.

(B) Process weight means the total weight of all materials introduced into a source operation, including solid fuels, but excluding liquids and gases used solely as fuels, and excluding air introduced for purposes of combustion. Process weight rate means a rate established as follows:

1. For continuous or long-run steady-state source operations the total process weight for the entire period of continuous operation or for a typical portion thereof, divided by the number of hours of such period or portion thereof;

2. For cyclical or batch source operations, the total process weight for a period which covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during such period; or

3. Where the nature of any process or operation or the design of any equipment is such as to permit more than one (1) interpretation of this section, that interpretation which results in the minimum value for allowable emission shall apply.

(C) The amount of particulate matter emitted shall be determined as specified in 10 CSR 10-6.030(5). Any other method which is in accordance with good professional practice may be used with the consent of the staff director.

(4) Emission Limitations. Except as provided for in subsection (4)(B) and section (5) of this regulation, no person shall cause, suffer, allow, or permit the emission of particulate matter in any one (1) hour

concentration, based on the source gas volume, below the concentration specified in Table II below for such volume; provided that, for the purposes of this subsection (4)(B) the person responsible for the emission may elect to substitute a volume determined according to the provisions of subsection (4)(C) of this regulation, and provided further that the burden of showing the source gas volume or other volume substituted therefor, including all the factors which determine such volume and the methods of determining and computing such volume, shall be on the person seeking to come within the provisions of this regulation.

Table II

Source Gas Volume, Standard Cubic Foot Per Minute	Concentration, Grain Per Standard Cubic Foot
7,000 or less	0.100
8,000	0.096
9,000	0.092
10,000	0.089
20,000	0.071
30,000	0.062
40,000	0.057
50,000	0.053
60,000	0.050
80,000	0.045
100,000	0.042
120,000	0.040
140,000	0.038
160,000	0.036
180,000	0.035
200,000	0.034
300,000	0.030
400,000	0.027
500,000	0.025
600,000	0.024
800,000	0.021
1,000,000 or more	0.020

(C) Any volume of gases passing through and leaving an air pollution abatement operation may be substituted for the source gas volume of the source operation served by such air pollution abatement operation for the purposes of subsection (4)(B) of this regulation provided such air pollution abatement operation emits no more than forty percent (40%) of the weight of particulate matter entering thereto; and provided further that such substituted volume shall be corrected to standard conditions and to a moisture content no greater than that of any gas stream entering such air pollution abatement operation.

(D) Notwithstanding the provisions of subsections (4)(A) and (4)(B)

Auth: section 203.050, RSMo (1978). Original rule filed March 24, 1971, effective April 3, 1971. Amended: Filed Jan. 31, 1972, effective Feb. 10, 1972. Amended: Filed June 30, 1975, effective July 10, 1975. Amended: Filed Aug. 16, 1977, effective Feb. 11, 1978. Amended: Filed May 12, 1978, effective Oct. 12, 1978. Amended: Filed March 15, 1979, effective Nov. 11, 1979. Amended: Filed Oct. 13, 1983. Effective March 12, 1984.

CYANAMID

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Mr. Nick Nikkila
Director, Enforcement Division
Air Pollution Control Program
Missouri Department of Natural Resources
P. O. Box 1368
Jefferson City, Missouri 65102

RE: Compliance Test - Ammonium Nitrate Manufacturing Facility

Dear Nick:

In accordance with the requirements of the Missouri Department of Natural Resources Air Pollution Control Regulations, attached please fine one (1) copy of a report on the compliance test performed on American Cyanamid Company's Ammonium Nitrate Manufacturing Facility located at Hannibal, Missouri, during the period of March 27 - 28, 1980.

As I have indicated to you in our several conversations, the results of the compliance test indicate these facilities are in full compliance with applicable Missouri Department of Natural Resources Regulations and are in fact operating at approximately 35 - 45% of the allowable particulate emission levels.

If you have any questions regarding this report or require additional information, please contact me at 1-314-769-2011, Ext. 268.

Very truly yours,

AMERICAN CYANAMID COMPANY
Agricultural Division

J. Brad Willett

J. Brad Willett, P.E.
Environmental Engineer

JBW:ml

Attachment

COMPLIANCE TESTING -
AMMONIUM NITRATE MANUFACTURING
FACILITY

American Cyanamid Company
Hannibal, Missouri

June, 1980

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CHAPTER I

INTRODUCTION

On March 27 and 28, 1980, the Technical Department of American Cyanamid Company, Hannibal, Mo., conducted a stack gas sampling/testing program on the emission control facilities of the American Cyanamid Company Ammonium Nitrate Manufacturing Plant located at Hannibal, Missouri. The purpose of the program was to determine the particulate emissions from these facilities in accordance with the requirements of the Missouri Department of Natural Resources Air Pollution Control Regulations. The testing was conducted by Mr. G. M. Stowe, Mr. E. A. Menze, Mr. J. E. Maple, and associates from the Hannibal Technical Department, under the direction of Mr. J. B. Willett and Mr. H. L. Lettington of the Hannibal Environmental Department. Also in attendance during the testing were Mr. Robert Eck and Mr. Tom Scheppers from the Missouri Department of Natural Resources.

CHAPTER 2
PROCESS DESCRIPTION

The ammonium nitrate plant prilling system consists of a circular prill tower which encases a CFCA shroud which in conjunction with the Brink® mist eliminator and the four tower fans compose the pollution abatement system. The majority of particulate emissions from the prilling process are collected by the CFCA shroud and transported to the Brink® mist eliminator where they are converted to liquid ammonium nitrate solution and returned to process. The sources of particulate emissions are the prill tower exhaust fans and the Brink® exhaust.

CHAPTER 3
OPERATING CONDITIONS

The location and orientation of the sampling ports was in accordance with Method 1 of the Federal Register 40 CFR 60 and/or as approved by the Missouri Department of Natural Resources during the initial compliance testing. A velocity and temperature traverse was run on March 14, 1980 to determine moisture content and select the proper nozzle size. Two particulate runs were completed on the tower fans, one on each fan, and three on the Brink® stack on March 27, 1980. The second run on the Brink® stack was voided because a leak developed in the sampling equipment during the run which made a third run necessary. A single run was completed on each of two tower fans and the Brink® stack on March 28, 1980.

CHAPTER 4

SAMPLING PROCEDURE AND ANALYTICAL METHODS

All emissions testing, laboratory analyses, and calculations to determine pollutant emission rates were conducted in accordance with test methods and procedures observed and approved by the Missouri Department of Natural Resources. This testing program was conducted in accordance with procedures established during the original compliance monitoring program.

CHAPTER 5
RESULTS

Test results, including average stack temperatures, velocities, flow rates, emission rates, moisture content, and isokinetic variation for each of the nine particulate runs are summarized in Table 1. Examples of the calculations for determining the above parameters for the Brink® mist eliminator are contained in Appendix A. Examples of the calculations for determining the above parameters for the prill tower fans are contained in Appendix B. Raw data recorded in the field during the tests is presented in Appendix C. Prill tower sampling equipment calibration data is shown in Appendix D.

TABLE I

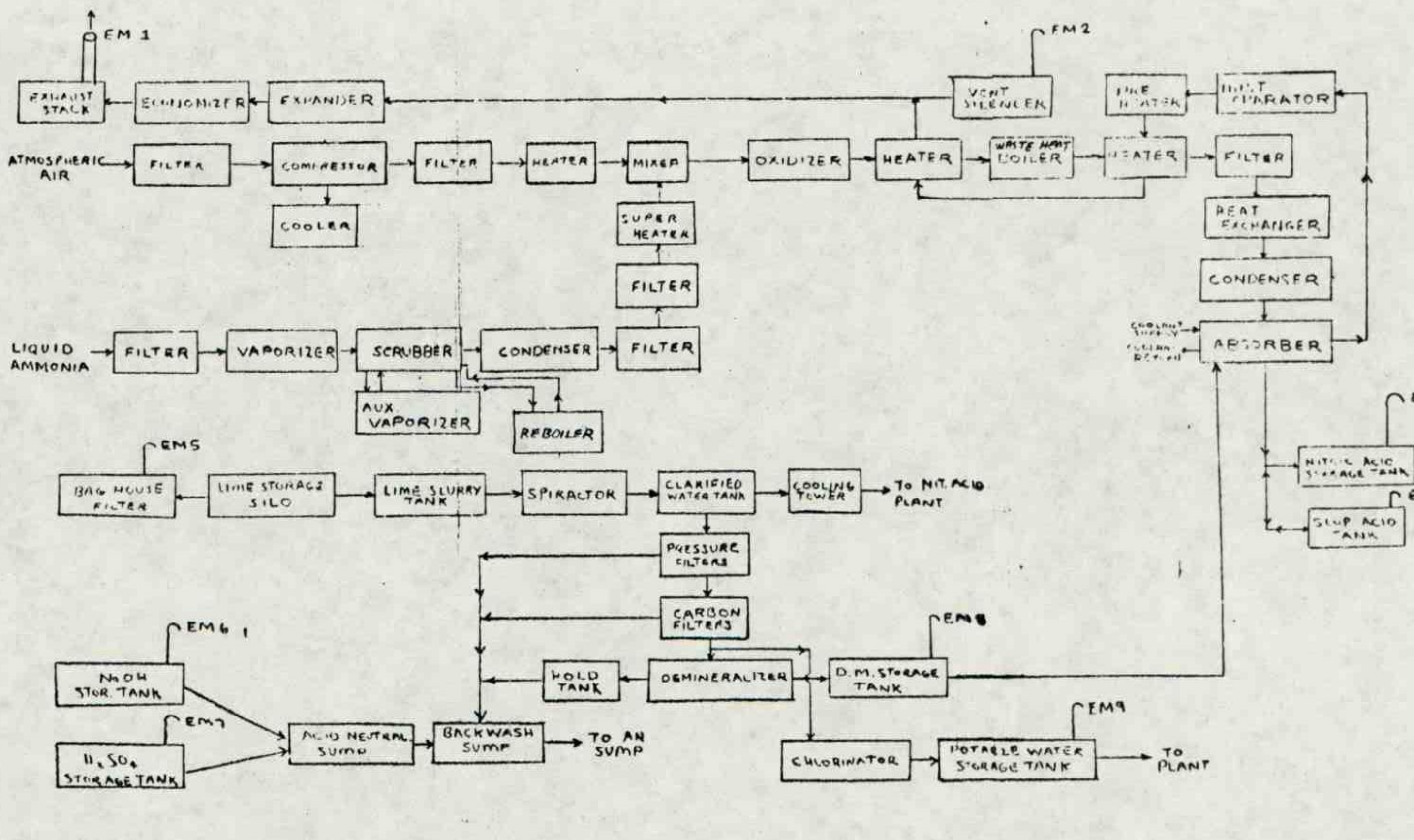
SUMMARY OF RESULTS FROM THE PARTICULATE EMISSIONS TESTS PERFORMED ON THE AMMONIUM NITRATE PLANT - HANNIBAL, MO.

Measured Parameters	3/27/80			3/27/80			3/28/80		
	Fan #1	Fan #3	Brinks®	Fan #2	Fan #4	Brinks®	Fan #1	Fan #3	Brinks®
Stack cross-sectional area at test ports (ft^2)	10.56	10.56	11.54	10.56	10.56	11.54	10.56	10.56	11.54
Barometric Pressure (in. Hg)	29.77	29.77	29.77	29.77	29.77	29.77	29.60	29.60	29.60
Avg. Stack Temp (°F)	64.9	61.6	109.3	73.5	74.3	110.5	64.7	64.1	102.4
Avg. Stack Velocity (ft/sec)	64.86	59.18	68.79	56.24	56.23	72.51	38.77	60.36	73.12
Stack Gas Flow Rate (ACFM)	41,095	37,496	47,630	35,634	35,627	50,206	24,565	38,244	50,628
Stack Gas Flow Rate (SCFM)	41,096	37,740	43,354	35,069	35,019	44,392	24,434	38,092	45,246
Stack Moisture Content (%)	0.8	0.7	2.0	1.0	1.3	3.2	1.0	0.8	5.0
Particulate Emissions (gr/SCF)	0.0114	0.0079	0.0039	0.0094	0.0044	0.0032	0.0113	0.0088	0.0050
Particulate Emissions (lb/hr)	4.02	2.54	1.46	2.81	1.34	1.20	2.36	2.87	1.93
Isokinetic Variation (%)	104	104	105	107	100	107	110	105	105
Total Rate of Emission (lb/hr)*	Run #1 = 14.58			Run #2 = 9.50			Run #3 = 12.39		
Production Rate (T/d)	556						520		
Allowable Rate of Emission (lb/hr)	33.67						32.19		

*Emission Rate Calculation

$$\left(\frac{\text{Fan A + Fan B}}{2}\right) \text{X } 4 + \text{Brinks} = \text{Total Rate of Emission}$$

CONFIDENTIAL INFORMATION OF AMERICAN CYANAMID COMPANY



EMISSION OF MATERIAL	1 LB/HR	2 (2) START-UP LB/HR	3 LB/HR	4 (3) LB/HR	5 (1) LB/HR	2 (2) EMERGENCY VENT LB/HR
O_2	4287	9452				9300
N_2	114146	31096				31254
$NO+NO_2$	36	124	12.2	.83		186
H_2O	238	260				106
ACFM		13155	4870	6.7	1280	20077
TEMP °F	187	300	96	96	AMB	700
PRESS. PSIG	.1	—	ATM	ATM	ATM	ATM
LIME PARTICUL.	—	—	—	—	.14	—

(1) HYDRATED LIME PARTICLES DURING TRUCK UNLOADING OPERATIONS

(2) OCCURS ONLY DURING PLANT SHUT DOWN, DURATION 2.67 HRS

(3) NO EMISSIONS DURING NORMAL OPERATING CONDITIONS

NOTE:
EM6, EM7, EM8, EM9 HAVE NO ANTICIPATED EMISSIONS DURING NORMAL OPERATING CONDITIONS

FIGURE III

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350 STPD NITRIC ACID PLANT
PROCESS FLOW DIAGRAM
GASEOUS EFFLUENTS
HANNIBAL, MO.

PROCESS FLOW SKETCH

AUTHORIZATION NO	DRAWING NO
AD 6444	—