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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

PRE-OPERATIONAL  
RADIOLOGICAL  
ENVIRONMENTAL MONITORING PROGRAM  
REPORT  
JANUARY 1, 1982 THROUGH JULY 30, 1982

DOCKET NO. 40-8602  
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PRE-OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

The essential program elements of the Pre-Operational Radiological Environmental Monitoring Program are discussed below and summarized in Table 5.5.0. SKM Map No. 1708 dated April 29, 1981, entitled "South Morton Pre-Operational Environmental Monitoring Baseline Map", which depicts the pre-operational sampling points, may be found in the January 1982 submittal of this report.

I. AIR PARTICULATES

Four Hi Volume air samplers are operated near the site boundaries and are identified on Map No. 1708 as ASVX1 through ASVX4. Three Hi Volume air samplers are operated near site boundary locations with the highest predicted airborne radionuclide concentrations. One Hi Volume sampler is operated at a control location which will have the lowest predicted radionuclide concentration from the licensee's operations. These samplers operated continuously for twenty-four (24) hours on a six day schedule. Two Low Volume air samplers are located as shown on Map No. 1708. One Low Volume air sampler is operated continuously at a ranch house, which is the nearest inhabited offsite structure downwind from the operation. One Low Volume air sampler is operated continuously at a control location approximately 15 KM to the southeast in the SE 1/4 Section 1, T33N, R71W.

II. METEOROLOGICAL DATA

The meteorological station provides continuous recording of



## II. METOROLOGICAL DATA (cont.)

the temperature, barometric pressure, relative humidity, precipitation, wind speed and wind direction.

The daily summary printout provides daily average, hourly average, minimum and maximum values for each meteorological parameter. In addition, the system is fully capable of providing additional pertinent information such as frequency distribution, and atmospheric stability (Pasquill Stability Categories A-G) based on wind direction sigma, and delta temperature.

## III. RADON-222

Six (6) Passive Radon Monitors located at the same location as the Hi and Low Volume air particulate samplers take continuous samples for six (6) consecutive days per month representing about the same period each month.

## IV. GAMMA DOSE

The gamma dose surveys are conducted at a height of one meter above the ground surface at the same locations used for collection of air particulates.

## V. GROUND WATER

The locations of the ground water sampling wells are depicted on Map No. 1708. Monitoring is conducted on the following monitor wells.

- A. Hydrologically down gradient wells include the licensee's drinking water well (WW2), a well used by the rancher for watering livestock during the summer months (WW1), two

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V. GROUND WATER (cont.)

- wells drilled by the licensee, which could be utilized as a source of industrial or livestock water, (WW3-WW4), and three additional monitoring wells (MW8-MW10).
- B. Four monitoring wells are located hydrologically down gradient of the tailings disposal area and hydrologically up gradient of the mill effluent impoundment area (MW4-MW7).
- C. Three monitoring wells are located hydrologically up gradient from all potentially disturbed areas (MW1-MW3).
- D. One monitor well (MW11) is located downstream of the effluent dam in the Box Creek Alluvium.

VI. SURFACE WATER

A total of five water sampling sites are utilized for the collection of grab samples in surface drainage following precipitation events. One site is upstream from any potential contamination from the mill on the South Fork of Box Creek (SWS2). Two sites are downstream from the mill on the South Fork of Box Creek since the natural drainage systems surrounding the mill area all feed into the South Fork of Box Creek (SWS3-SWS4). The fourth sampling site selected is in the North Fork of Box Creek, which receives no runoff from the licensee's mill operations (SWS5). The fifth site is downstream from the junction of the North and South Forks of Box Creek (SWS6).

VII. SOIL

Surface soil samples are collected at the same locations as used for collection of air particulates (sites ASVX1 - ASVX6).

VIII. VEGETATION

Vegetation samples are obtained at grazing areas near the Hi Volume air particulate sampling sites ASVX1 through ASVX4.

X. SUPPLEMENTAL INFORMATION

The following information is provided within:

- A. Calibration of Air Samplers
- B. Lower Limit of Detection
- C. Additional Information
  - 1. Description of Sampling Equipment
  - 2. Operating Procedures
  - 3. Quality Assurance Program
  - 4. Analytical Procedures

I. AIR PARTICULATE

Total suspended particulate data and radiological parameters of quarterly composite air filters for the Hi Volume air samplers ASVX1 through ASVX4 and Low Volume air samplers ASVX5 and ASVX6 are tabulated and presented in Table 1 and Table 2 respectively.







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TABLE 1 AIR PARTICULATE DATA

SAMPLE NUMBER	DATE	TIME RAN MIN.	m <sup>3</sup> /M AIR	CHANGE IN WEIGHT	m <sup>3</sup> AIR	TOTAL PARTICULATES $\mu\text{g}/\text{m}^3$
ASVX2						
January	01-05-82	1449	1.50	0.0496	2180.47	22.75
	01-11-82	1451	1.52	0.0323	2207.55	14.63
	01-17-82	1451	1.50	0.0734	2173.46	33.77
	01-23-82	1450	1.60	0.0920	2320.38	39.65
	01-29-82	1449	1.51	0.0222	2185.55	10.16
February	02-04-82	1448	1.53	0.0248	2222.20	11.16
	02-10-82	1500	1.15	0.0446	1724.88	25.86
	02-16-82	915	1.10	0.0345	1009.71	34.17
	02-22-82	1451	1.51	0.0388	2184.63	17.76
	02-28-82	1450	1.24	0.0440	1796.43	24.49
March	03-06-82	1447	1.31	0.0245	1893.39	12.94
	03-12-82	1080	1.25	0.0410	1346.02	30.46
	03-18-82	1450	1.54	0.0609	2235.23	27.25
	03-24-82	1449	1.59	0.0101	2307.64	4.38
	03-30-82	1448	1.37	0.0260	1984.44	13.10
April	04-05-82	1450	1.56	0.0129	2262.74	5.70
	04-11-82	1446	1.42	0.1860	2055.55	90.49
	04-17-82	1446	1.56	0.0271	2261.02	11.99
	04-23-29	1447	1.49	0.0418	2149.99	19.44
	04-29-82	1447	1.47	0.0263	2133.07	12.33

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TABLE 1 AIR PARTICULATE DATA

SAMPLE NUMBER	DATE	TIME RAN MIN	m <sup>3</sup> /M AIR	CHANGE IN WEIGHT	m <sup>3</sup> AIR	TOTAL PARTICULATES $\mu\text{g}/\text{m}^3$
ASVX3						
January	01-05-82	1450	1.54	0.0463	2237.92	20.69
	01-11-82	1450	1.59	0.0292	2303.76	12.67
	01-17-82	1451	1.54	0.0868	2228.14	38.96
	01-23-82	1450	1.61	0.1120	2334.27	47.98
	01-29-82	1450	1.49	0.2893	2159.37	133.97
February	02-04-82	1449	1.71	0.0186	2470.81	7.53
	02-10-82	1450	1.59	0.0569	2311.92	24.61
	02-16-82	1450	1.46	0.0584	2115.38	2761
	02-22-82	--	--	--	--	--
	02-28-82	1453	1.53	0.0537	2226.14	24.12
March	03-06-82	1450	1.57	0.0778	2273.99	34.21
	03-12-82	1450	1.49	0.0744	2163.12	34.39
	03-18-82	1449	1.54	0.0398	2233.69	17.82
	03-24-82	1449	1.58	0.0139	2293.73	6.06
	03-30-82	1450	1.45	0.00338	2096.82	16.12
April	04-05-82	1449	1.51	0.0375	2191.82	17.11
	04-11-82	1450	1.40	0.2242	2034.47	110.20
	04-17-82	1450	1.49	0.0273	2158.01	12.65
	04-23-82	1450	1.45	0.0679	2100.58	32.32
	04-29-82	1449	1.52	0.0311	2204.05	14.11

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TABLE 1 AIR PARTICULATE DATA

SAMPLE NUMBER	DATE	TIME RAN MIN.	m <sup>3</sup> /M AIR	CHANGE IN WEIGHT	m <sup>3</sup> AIR	TOTAL PARTICULATES $\mu\text{g}/\text{m}^3$
ASVX4						
January	01-05-82	1462	1.59	0.0450	2326.95	19.34
	01-11-82	1411	1.61	0.0363	2268.97	15.95
	01-17-82	1462	1.43	0.0535	2093.53	25.55
	01-23-82	1409	1.49	0.0572	2092.75	27.33
	01-29-82	1462	1.46	0.0312	2135.37	14.61
February	02-04-82	1410	1.63	0.0181	2305.31	7.85
	02-10-82	1410	1.49	0.0403	2098.27	19.21
	02-16-82	1461	1.43	0.0299	2090.44	14.30
	02-22-82	1461	1.46	0.0335	2130.94	15.72
	02-28-82	1461	1.47	0.0302	2141.68	14.10
March	03-06-82	1461	1.50	0.0123	2192.85	5.61
	03-12-82	1461	1.51	0.0329	2255.46	15.69
	03-18-82	1461	1.45	0.0643	2114.02	30.42
	03-24-82	1460	1.48	0.0127	2157.07	5.89
	03-30-82	1459	1.44	0.0154	2096.04	7.35
April	04-05-82	1459	1.46	0.0153	2123.14	7.21
	04-11-82	1461	1.39	0.0498	2036.42	24.45
	04-17-82	1462	1.44	0.0189	2107.01	8.97
	04-23-82	1463	1.48	0.0472	2173.76	21.71
	04-29-82	1461	1.46	0.0529	2139.99	24.72



LO-VOLUME SAMPLER ASVX5

TABLE 1

SAMPLE NUMBER	START	STOP	TOTAL MINUTES	CFM AIR	M <sup>3</sup> AIR
ASVX5	1/02/82 1930	1/05/82 1015	3765	7.0	738
January	1/05/82 1015	1/08/82 2219	5040	7.1	1002
	1/08/82 2215	1/11/82 1015	3600	7.0	706
	1/11/82 1015	1/14/82 2215	5040	7.1	1002
	1/14/82 2215	1/18/82 1030	5055	7.0	991
	1/18/82 1030	1/21/82 2230	5040	7.1	1002
	1/21/82 2230	1/25/82 1030	5040	7.9	1115
	1/25/82 1030	1/26/82 0915	1365	7.1	271
	1/26/82 1000	1/29/82 2200	5040	7.1	1002
	1/29/82 2200	2/02/82 0945	5025	7.9	1112
ASVX5	2/02/82 0945	2/05/82 2145	----	---	----
February	2/05/82 2145	2/09/82 0945	5040	7.9	1115
	2/09/82 0945	2/12/82 1300	4515	7.9	999
	2/12/82 1300	2/16/82 1200	5700	7.9	1261
	2/16/82 1200	2/19/82 2400	5040	7.4	1044
	2/19/82 2400	2/22/82 0835	3395	7.9	751
	2/22/82 0835	2/25/82 2035	5040	7.4	1044
	2/25/82 2035	3/01/82 0900	5065	7.1	1007
ASVX5	3/01/82 0900	3/04/82 2100	5040	7.4	1044
March	3/04/82 2100	3/08/82 0900	5040	7.1	1002
	3/08/82 0900	3/11/82 0950	4370	7.4	903
	3/11/82 0950	3/14/82 2150	5040	7.4	1044
	3/14/82 2150	3/18/82 0845	4975	7.1	930





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LO-VOLUME SAMPLER ASVX6

TABLE 1

SAMPLE NUMBER	START		STOP		TOTAL MINUTES	CFM AIR	M <sup>3</sup> AIR
ASVX6	1/05/82	1340	1/11/82	0830	8330	6.0	1400
January	1/11/82	0830	1/19/82	1225	11750	6.0	1974
	1/19/82	1225	1/27/82	1100	11432	6.0	1921
	1/27/81	1100	2/02/82	1200	8695	6.0	1461
ASVX6	2/02/82	1200	2/08/82	1015	8521	6.0	1432
February	2/08/82	1015	2/12/82	0900	5399	6.0	907
	2/12/82	0945	2/19/82	1000	10002	5.7	1596
	2/19/82	1000	2/26/82	0845	9998	5.7	1596
	2/26/82	0845	3/02/82	1310	6022	5.7	961
ASVX6	3/02/82	1310	3/08/82	1430	8721	5.7	1392
March	3/08/82	1430	3/18/82	1030	14155	5.7	2259
	3/18/82	1030	3/22/82	0915	5681	5.7	907
	3/22/82	1015	4/07/82	1100	23080	6.0	3877
ASVX6	4/07/82	1100	4/13/82	1115	8655	6.0	1454
April	4/13/82	1115	4/20/82	0900	9942	6.0	1670
	4/20/82	0900	4/30/82	1330	14670	6.0	2465
	4/30/82	1330	5/05/82	0945	6975	6.2	1211
ASVX6	5/05/82	1015	5/07/82	1300	3045	6.2	529
May	5/07/82	1300	5/13/82	1110	8530	6.2	1481
	5/13/82	1110	5/21/82	0945	11435	6.2	1985
	5/21/82	0945	5/28/82	0900	10035	6.2	1742

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TABLE 2 RADIOLOGICAL ANALYSIS OF QUARTERLY COMPOSITE AIR FILTERS

QUARTER: October, 1981 - December, 1981

Sample Location	Volume (m <sup>3</sup> )	Radionuclide	Concentration pCi/m <sup>3</sup> X 10 <sup>-4</sup>	Error Estimate* pCi/m <sup>3</sup> X 10 <sup>-4</sup>	LLD pCi/m <sup>3</sup> X 10 <sup>-4</sup>
ASVX1	35,263	U <sub>nat</sub>	2.6		0.3
		Ra-226	0.1	0.1	0.1
		Th-230	1.7	0.6	0.1
		Pb-210	156	8	0.3
ASVX2	34,002	U <sub>nat</sub>	2.9		0.3
		Ra-226	0.6	0.1	0.1
		Th-230	1.4	0.6	0.2
		Pb-210	91	5	0.3
ASVX3	34,876	U <sub>nat</sub>	7.7		0.3
		Ra-226	2.0	0.2	0.1
		Th-230	3.9	1.0	0.2
		Pb-210	156	7	0.3
ASVX4	36,199	U <sub>nat</sub>	7.0		0.3
		Ra-226	0.8	0.1	0.1
		Th-230	0.5	0.5	0.1
		Pb-210	166	7	0.3
ASVX5	25,875	U <sub>nat</sub>	1.2		0.3
		Ra-226	0.3	0.1	0.1
		Th-230	0.8	0.8	0.4
		Pb-210	119	7	0.3
ASVX6	22,099	U <sub>nat</sub>	1.8		0.3
		Ra-226	0.8	0.2	0.1
		Th-230	1.8	1.0	0.3
		Pb-210	222	11	0.3

\* Error Estimate at the 95% Confidence level.

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MORTON RANCH PROJECT

TABLE 2 RADIOLOGICAL ANALYSIS OF QUARTERLY COMPOSITE AIR FILTERS

QUARTER: January, 1982 - March, 1982

Sample Location	Volume (m <sup>3</sup> )	Radionuclide	Concentration pCi/m <sup>3</sup> X 10 <sup>-4</sup>	Error Estimate* pCi/m <sup>3</sup> X 10 <sup>-4</sup>	LLD pCi/m <sup>3</sup> X 10 <sup>-4</sup>
ASVX-1	34419	Unat	0.4		0.07
		Ra-226	0.4	0.3	0.1
		Th-230	0.2	0.5	0.1
		Pb-210	78.0	3.0	2.0
ASVX-2	29772	Unat	4.1		0.07
		Ra-226	1.7	0.4	0.1
		Th-230	1.1	0.5	0.7
		Pb-210	137.0	2.0	3.0
ASVX-3	31449	Unat	5.3		0.07
		Ra-226	3.7	0.3	0.1
		Th-230	0.1	0.3	0.2
		Pb-210	130.0	4.0	2.0
ASVX-4	32341	Unat	1.0		0.07
		Ra-226	0.7	0.2	0.1
		Th-230	0.1	0.1	0.1
		Pb-210	138.0	3.0	2.0
ASVX-5	25371	Unat	0.8		0.07
		Ra-226	0.0	0.3	0.1
		Th-230	0.2	0.4	0.3
		Pb-210	128.0	2.0	2.0
ASVX-6	21683	Unat	0.4		0.07
		Ra-226	0.0	0.2	0.1
		Th-230	0.4	1.0	1.0
		Pb-210	125.0	4.0	3.0

\* Error Estimate at the 95% Confidence level.

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TABLE 2 RADIOLOGICAL ANALYSIS OF QUARTERLY COMPOSITE AIR FILTERS

QUARTER: April, 1982 - June, 1982

Sample Location	Volume (m <sup>3</sup> )	Radionuclide	Concentration pCi/m <sup>3</sup> X 10 <sup>-4</sup>	Error Estimate* pCi/m <sup>3</sup> X 10 <sup>-4</sup>	LLD pCi/m <sup>3</sup> X 10 <sup>-4</sup>
ASVX-1	33137	Unat	**		**
		Ra-226	0.6	0.1	0.1
		Th-230	0.2	0.5	0.5
		Pb-210	72.0	17.0	2.0
ASVX-2	32544	Unat	**		**
		Ra-226	0.3	0.1	0.1
		Th-230	2.2	1.5	0.2
		Pb-210	105.0	4.0	1.0
ASVX-3	32840	Unat	**		**
		Ra-226	0.3	0.1	0.1
		Th-230	0.7	0.6	0.2
		Pb-210	118.0	7.0	1.0
ASVX-4	30243	Unat	**		**
		Ra-226	1.0	0.1	0.1
		Th-230	0.3	0.5	0.3
		Pb-210	183.0	8.0	1.0
ASVX-5	25121	Unat	**		**
		Ra-226	0.7	0.1	0.1
		Th-230	0.8	0.8	0.4
		Pb-210	51.0	5.0	1.0
ASVX-6	22836	Unat	**		**
		Ra-226	0.1	0.1	0.1
		Th-230	0.2	0.4	0.3
		Pb-210	44.0	5.0	1.0

\* Error Estimate at the 95% confidence level.

\*\* Analysis not complete - will be reported in next report.

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II. METEOROLOGICAL DATA

The daily average meteorological data collected at the Morton Ranch site for the period January, 1982 through July, 1982 is provided on Table 3. The joint frequency distributions for the level one (WD1) and level two (WD2) are presented in Tables 4 and 5. Additional information such as atmospheric stability (Pasquill Stability Categories A-G) based on wind direction sigma, and delta temperature are provided in Tables 6, 7, and 8.

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TABLE 3 DAILY AVERAGE WEATHER DATA

Date	Level 2 Wind Dir./Dev. Degrees	Level 2 Wind Spd. mph	Level 1 Wind Dir./Dev. Degrees	Level 1 Wind Spd. mph	Level 1 Temp. DGF	$\Delta T$ DGC	RH %	PRS INH	RFL IN.
1-01-82	199/7	12	205/9	8	22	1.5	73	24.30	.00
1-02-82	178/7	13	188/17	9	16	1.0	63	24.39	.00
1-03-82	254/10	30	255/9	20	16	.6	58	24.39	.00
1-04-82	240/9	42	242/6	30	26	.3	58	24.42	.01
1-05-82	32/10	7	41/11	6	11	-.4	83	24.43	.05
1-06-82	278/13	11	276/14	7	-1	1.2	78	24.70	.01
1-07-82	246/4	33	243/11	23	11	.8	54	24.92	.01
1-08-82	254/3	40	256/8	28	25	.4	55	24.87	.00
1-09-82	286/5	21	296/8	14	18	.0	69	24.94	.01
1-10-82	127/14	7	122/24	4	-4	.3	79	25.00	.01
1-11-82	271/11	13	272/27	7	15	2.5	78	24.55	.01
1-12-82	290/10	15	291/17	10	12	.2	86	24.67	.01
1-13-82	271/3	28	271/4	20	22	.3	73	24.66	.01
1-14-82	256/6	34	255/5	23	30	.9	61	24.53	.00
1-15-82	321/9	16	335/13	12	4	.0	78	24.69	.01
1-16-82	241/14	17	235/18	12	7	1.1	87	24.71	.01
1-17-82	259/23	22	264/16	16	34	.3	65	24.44	.01
1-18-82	250/9	23	249/16	14	32	.9	66	24.47	.01
1-19-82	194/29	5	171/15	2	18	1.1	78	24.59	.01
1-20-82	259/8	15	262/8	9	18	.9	71	24.63	.00
1-21-82	119/7	16	122/10	13	8	-.4	86	24.53	.01
1-22-82	318/7	18	323/12	13	-9	.0	87	24.63	.00
1-23-82	256/7	33	257/13	23	21	.6	82	24.62	.00
1-24-82	259/7	31	261/6	22	36	.3	67	24.64	.00
1-25-82	240/11	14	235/13	10	31	1.2	61	24.86	.00
1-26-82	245/12	41	251/12	28	48	.6	45	24.49	.00
1-27-82	273/12	21	280/14	15	34	.1	59	24.65	.00
1-28-82	229/19	4	234/39	3	31	.8	58	24.68	.01
1-29-82	282/13	10	276/18	6	27	.8	65	24.74	.01
1-30-82	287/11	13	294/21	8	30	.5	66	24.83	.00
1-31-82	257/8	17	260/10	12	30	.5	73	24.67	.04

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 3 DAILY AVERAGE WEATHER DATA

Date	Level 2 Wind Dir./Dev. Degrees	Level 2 Wind Spd. mph	Level 1 Wind Dir./Dev. Degrees	Level 1 Wind Spd. mph	Level 1 Temp. DGF	ΔT DGC	RH %	PRS INH	RFL IN.
2-01-82	313/8	13	319/11	10	20	.0	82	24.81	.00
2-02-82	284/7	9	284/7	6	14	.6	78	24.82	.00
2-03-82	346/5	12	355/10	10	-10	-.2	87	24.89	.01
2-04-82	306/9	10	303/13	7	-16	1.0	86	24.90	.00
2-05-82	258/3	34	261/5	24	-3	.7	80	24.89	.02
2-06-82	250/5	37	253/8	26	14	.4	48	24.85	.01
2-07-82	330/7	8	351/7	6	11	-.1	76	24.77	.01
2-08-82	349/9	10	348/18	6	-1	.6	84	24.81	.03
2-09-82	222/23	9	220/40	7	0	2.4	76	24.65	.00
2-10-82	246/10	28	245/10	20	13	1.5	58	24.62	.00
2-11-82	236/5	24	231/7	17	22	1.9	46	24.71	.00
2-12-82	254/5	32	259/9	21	28	.9	52	24.91	.01
2-13-82	247/6	44	252/4	32	38	.4	41	24.66	.00
2-14-82	245/7	41	250/5	30	44	.2	58	24.43	.01
2-15-82	247/3	32	251/8	22	43	.4	64	24.63	.00
2-16-82	251/7	33	255/8	23	45	.3	60	24.62	.00
2-17-82	259/16	23	262/16	16	40	.6	54	24.71	.00
2-18-82	260/8	15	262/11	9	39	1.1	62	24.85	.01
2-19-82	246/4	39	250/6	29	44	.1	53	24.76	.00
2-20-82	253/6	38	258/4	27	45	.3	57	24.86	.01
2-21-82	246/4	33	250/5	23	51	.5	55	24.84	.01
2-22-82	269/9	8	291/12	5	41	.3	65	24.73	.01
2-23-82	240/9	11	239/9	9	30	.1	79	24.69	.01
2-24-82	335/13	5	341/16	3	21	.5	56	24.99	.01
2-25-82	157/17	11	175/25	7	24	1.0	65	24.96	.01
2-26-82	227/10	12	226/16	11	37	2.9	51	24.81	.01
2-27-82	248/8	25	248/8	16	40	1.5	56	24.76	.01
2-28-82	260/14	17	260/16	12	40	.8	52	24.93	.01

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 3 DAILY AVERAGE WEATHER DATA

Date	Level 2 Wind Dir./Dev. Degrees	Level 2 Wind Spd. mph	Level 1 Wind Dir./Dev. Degrees	Level 1 Wind Spd. mph	Level 1 Temp. DGF	ΔT DGC	RH %	PRS INH	RFL IN.
3-01-82	243/4	33	248/5	24	48	.3	52	24.73	.00
3-02-82	303/16	4	325/18	2	35	-.3	81	24.59	.02
3-03-82	55/27	3	54/41	2	29	-.2	76	24.57	.01
3-04-82	0/9	10	10/20	8	17	-.1	91	24.68	.09
3-05-82	265/8	13	265/13	8	19	.5	78	24.79	.01
3-06-82	357/7	6	355/17	4	21	.6	79	24.82	.01
3-07-82	272/12	12	274/9	8	30	.1	70	24.68	.01
3-08-82	197/13	3	180/17	2	29	.0	75	24.76	.01
3-09-82	260/9	31	265/10	22	43	.2	49	24.70	.01
3-10-82	269/8	15	280/6	11	38	.3	61	24.67	.01
3-11-82	234/9	29	237/8	22	47	.2	57	24.46	.01
3-12-82	266/9	32	274/10	24	32	-.2	62	24.45	.01
3-13-82	240/17	17	242/13	13	39	.4	45	24.69	.00
3-14-82	227/9	17	228/15	13	46	1.0	47	24.49	.00
3-15-82	249/8	17	255/8	12	45	.2	68	24.30	.01
3-16-82	205/27	4	197/19	3	36	-.1	73	24.54	.02
3-17-82	231/13	14	237/16	12	36	-.1	68	24.62	.00
3-18-82	126/11	29	138/13	22	34	-.7	81	24.63	.01
3-19-82	281/7	17	285/13	13	28	-.2	87	24.48	.03
3-20-82	312/4	23	321/6	18	19	-.3	87	24.73	.01
3-21-82	300/11	8	300/12	5	24	.6	60	24.86	.00
3-22-82	275/23	7	272/27	7	29	.7	56	24.78	.00
3-23-82	272/8	18	278/15	13	34	.1	56	24.57	.00
3-24-82	344/12	12	359/16	9	22	-.1	92	24.73	.05
3-25-82	161/10	7	173/21	5	23	.6	75	24.86	.00
3-26-82	93/19	9	94/41	6	32	.6	75	24.67	.00
3-27-82	202/15	15	207/18	12	42	.6	58	24.65	.00
3-28-82	217/10	19	219/13	14	48	.6	52	24.53	.00
3-29-82	242/20	17	249/25	13	42	.7	64	24.21	.00
3-30-82	261/8	30	266/7	23	31	-.1	60	24.45	.00
3-31-82	235/10	23	238/14	17	41	.2	51	24.69	.00

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 3 DAILY AVERAGE WEATHER DATA

Date	Level 2 Wind Dir./Dev. Degrees	Level 2 Wind Spd. mph	Level 1 Wind Dir./Dev. Degrees	Level 1 Wind Spd. mph	Level 1 Temp. DGF	$\Delta T$ DGC	RH %	PRS INH	RFL IN.
4-01-82	228/7	28	230/9	20	53	.4	42	24.42	.00
4-02-82	321/9	26	329/8	21	27	-.2	87	24.47	.02
4-03-82	259/16	21	264/17	16	37	.4	59	24.60	.01
4-04-82	269/17	8	287/16	5	31	.6	79	24.54	.04
4-05-82	297/21	2	297/22	2	25	-.3	79	24.78	.00
4-06-82	138/8	15	147/9	11	30	-.3	80	24.55	.03
4-07-82	325/10	13	333/11	12	24	-.4	85	24.55	.05
4-08-82	278/9	19	286/7	14	23	-.1	67	24.72	.00
4-09-82	296/8	15	303/6	10	27	.2	71	24.75	.00
4-10-82	246/7	32	248/9	24	39	.1	55	24.72	.01
4-11-82	243/4	45	249/11	34	56	-.2	50	24.51	.00
4-12-82	266/12	28	273/10	20	48	.0	62	24.55	.00
4-13-82	251/4	26	255/12	19	50	.4	57	24.64	.00
4-14-82	238/10	21	240/12	16	54	.8	51	24.53	.00
4-15-82	267/8	23	272/10	17	45	.0	56	24.54	.00
4-16-82	316/12	11	320/19	8	30	.2	64	24.85	.00
4-17-82	228/10	13	238/20	11	41	.8	46	24.78	.00
4-18-82	295/10	20	298/11	15	37	.4	68	24.67	.00
4-19-82	320/7	26	328/7	21	26	-.4	70	24.89	.01
4-20-82	317/15	12	329/16	10	26	.0	81	25.05	.00
4-21-82	289/15	13	289/13	9	37	.4	58	25.05	.01
4-22-82	184/8	14	194/11	11	48	1.2	60	24.99	.00
4-23-82	217/20	7	218/29	7	54	2.1	56	24.71	.01
4-24-82	346/17	5	349/16	4	56	1.4	61	24.59	.00
4-25-82	61/18	11	68/14	9	44	-.4	74	24.74	.01
4-26-82	101/15	13	106/13	11	40	-.7	77	24.82	.01
4-27-82	158/24	12	167/16	10	40	-.2	82	24.80	.15
4-28-82	208/19	8	212/20	6	50	.4	69	24.74	.02
4-29-82	191/18	4	241/15	2	43	.4	76	24.72	.03
4-30-82	159/23	16	171/28	10	48	.3	69	24.84	.01

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 3 DAILY AVERAGE WEATHER DATA

Date	Level 2 Wind Dir./Dev. Degrees	Level 2 Wind Spd. mph	Level 1 Wind Dir./Dev. Degrees	Level 1 Wind Spd. mph	Level 1 Temp. DGF	$\Delta T$ DGC	RH %	PRS INH	RFL IN.
5-01-82	192/14	9	210/15	7	57	.2	65	24.76	.00
5-02-82	209/40	11	215/28	10	64	1.2	66	24.72	.01
5-03-82	238/11	23	241/8	18	62	.3	70	24.62	.00
5-04-82	337/12	16	352/10	14	44	-.5	73	24.69	.01
5-05-82	323/18	8	319/26	6	38	.1	64	24.82	.01
5-06-82	281/10	13	281/13	10	43	.7	63	24.75	.01
5-07-82	289/33	6	280/54	5	48	.5	69	24.63	.01
5-08-82	251/30	5	252/24	3	50	.3	76	24.58	.15
5-09-82	157/29	6	163/27	5	53	.1	74	24.52	.00
5-10-82	341/12	16	352/9	14	39	-.5	82	24.63	.05
5-11-82	71/8	8	82/13	7	36	-.5	85	24.72	.15
5-12-82	94/27	3	98/25	2	42	-.3	81	24.65	.02
5-13-82	360/12	21	10/8	16	43	-.1	82	24.68	.31
5-14-82	337/7	27	346/7	22	41	-.3	85	24.76	.73
5-15-82	316/6	22	324/6	17	43	-.3	84	24.74	.08
5-16-82	318/12	19	327/7	15	45	-.3	81	24.77	.11
5-17-82	317/13	5	319/7	4	51	.1	72	24.76	.01
5-18-82	177/17	11	185/26	8	58	.8	71	24.62	.01
5-19-82	302/30	7	325/30	4	53	.1	77	24.63	.06
5-20-82	328/5	24	337/6	20	41	-.4	84	.82	.13
5-21-82	310/14	9	310/24	6	50	.4	72	24.84	.00
5-22-82	147/15	9	169/25	7	58	1.0	68	24.77	.01
5-23-82	331/15	6	352/14	7	55	.1	75	24.74	.00
5-24-82	320/16	11	331/14	9	47	-.4	73	24.87	.19
5-25-82	217/28	6	218/39	4	47	.1	75	24.69	.10
5-26-82	191/17	9	202/20	7	56	.4	69	24.55	.00
5-27-82	127/27	8	131/40	6	62	.5	71	24.54	.00
5-28-82	248/13	14	259/11	13	54	.0	72	24.57	.00
5-29-82	266/14	11	269/12	8	49	.1	68	24.65	.00
5-30-82	9/20	11	21/20	9	45	-.5	72	24.77	.00
5-31-82	12/8	6	13/9	5	45	-.3	71	24.86	.00

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 3 DAILY AVERAGE WEATHER DATA

DATE	Level 2 Wind Dir./Dev. Degrees	Level 2 Wind Spd. mph	Level 1 Wind Dir./Dev. Degrees	Level 1 Wind Spd. mph	Level 1 Temp. DGF	$\Delta T$ DGC	RH %	PRS INH	RFL IN.
6-01-82	105/11	10	109/14	7	48	-.2	79	24.66	.30
6-02-82	99/8	13	105/8	11	43	-.4	89	24.70	.52
6-03-82	133/17	2	153/23	1	48	-.2	81	24.72	.11
6-04-82	191/22	10	195/23	9	57	1.1	71	24.63	.07
6-05-82	150/22	9	158/31	7	58	.0	69	24.55	.00
6-06-82	263/11	26	269/16	20	49	-.3	70	24.63	.00
6-07-82	154/23	10	167/28	7	55	.5	69	24.70	.00
6-08-82	313/12	20	321/16	16	47	-.3	77	24.71	.01
6-09-82	287/26	7	289/32	6	48	.3	70	24.88	.01
6-10-82	112/28	8	112/32	5	54	.2	70	24.81	.00
6-11-82	97/21	4	78/35	2	57	.4	71	24.82	.01
6-12-82	134/11	18	142/16	12	60	-.1	71	24.76	.01
6-13-82	138/12	16	145/18	12	60	.0	76	24.68	.05
6-14-82	322/14	6	334/20	4	54	.1	79	24.67	.38
6-15-82	317/17	2	326/26	1	54	-.2	80	24.80	.11
6-16-82	273/7	13	272/9	9	59	.7	74	24.75	.12
6-17-82	336/15	12	346/17	9	52	-.2	80	24.80	.18
6-18-82	339/15	11	347/12	8	51	-.2	75	24.87	.01
6-19-82	284/12	6	285/17	4	58	.8	69	24.82	.00
6-20-82	111/23	4	147/33	2	63	.3	70	24.79	.01
6-21-82	157/41	5	169/43	3	63	.4	72	24.76	.01
6-22-82	216/16	9	222/33	6	67	.7	70	24.75	.00
6-23-82	298/11	10	313/10	6	66	.3	73	24.90	.18
6-24-82	71/17	7	80/19	5	58	-.4	80	24.87	.19
6-25-82	158/16	14	163/17	11	57	-.1	80	24.81	.00
6-26-82	295/9	13	307/27	9	61	.1	74	24.80	.00
6-27-82	160/15	9	174/21	7	66	.4	71	24.78	.00
6-28-82	118/14	5	126/16	4	69	.6	74	24.67	.00
6-29-82	98/8	15	103/12	12	62	-.6	79	24.69	.00
6-30-82	129/15	16	134/16	11	65	-.1	75	24.71	.00

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SILVER KING MINES, INC.  
MORTON RANCH

TABLE 4 LEVEL ONE (WD1) FREQUENCY DISTRIBUTION  
January 1, 1982 through June 30, 1992

WIND DIRECTION	WIND SPEED						TOTAL
	0 -> 10	11 -> 20	21 -> 30	31 -> 40	41 -> 50	51 -> 60	
N	2.5	3.4	1.0	0.1	<0.1		7.0
NNE	1.9	1.7	0.3	<0.1			3.9
NE	2.0	0.5	<0.1				2.5
ENE	2.3	0.3	<0.1				2.6
E	2.8	0.9	<0.1				3.7
ESE	2.1	1.1	0.1				3.3
SE	2.0	1.5	0.2	0.1			3.8
SSE	2.1	1.9	0.5	0.2	<0.1		4.7
S	1.9	2.8	0.9	<0.1	<0.1		5.6
SSW	1.9	2.8	0.1	<0.1			4.8
SW	2.0	4.8	1.4	0.2	<0.1		8.4
WSW	2.1	6.0	6.5	2.7	0.5	0.1	17.9
W	2.9	3.4	4.1	1.5	0.1	<0.1	12.0
WNW	2.9	1.8	0.6	0.1	<0.1		5.4
NW	2.6	2.7	0.8	0.1			6.2
NNW	2.5	3.7	1.8	0.2			8.2
TOTAL	36.5	39.3	18.3	5.2	0.6	0.1	100.0

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SILVER KING MINES, INC.  
MORTON RANCH

TABLE 5 LEVEL TWO (WD2) FREQUENCY DISTRIBUTION  
January 1, 1982 through June 30, 1982

WIND DIRECTION	WIND SPEED						TOTAL
	0 -> 10	11 -> 20	21 -> 30	31 -> 40	41 -> 50	51 -> 60	
N	1.3	2.2	0.7	0.1			4.3
NNE	1.3	1.2	0.3				2.8
NE	2.0	0.6					2.6
ENE	2.0	0.9					2.9
E	2.0	1.8	0.3				4.1
ESE	1.3	2.0	0.5				3.8
SE	1.0	1.8	0.7	0.2	0.2		3.9
SSE	1.0	1.4	1.3	1.0			4.7
S	1.4	1.6	1.0	0.1			4.1
SSW	1.0	2.1	0.5				3.6
SW	0.8	3.2	2.0	1.1	0.3		7.4
WSW	0.8	2.6	5.9	7.1	3.1	0.5	20.0
W	1.2	2.3	3.0	3.0	1.0		10.5
WNW	1.2	2.4	0.9	0.3			4.8
NW	2.0	4.4	2.7	0.8	0.1		10.0
NNW	2.4	4.8	2.6	0.7			10.5
TOTAL	22.7	35.3	22.4	14.4	4.7	0.5	100.0

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SILVER KING MINES, INC  
MORTON RANCH PROJECT

TABLE 6 LEVEL ONE (WD1) ATMOSPHERIC STABILITY BY  $\sigma_{\theta}$

STABILITY CLASS

<u>Date</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>TOTAL</u>
01-82	1.1	1.1	3.9	5.5	3.9	1.6		17.1
02-82	1.1		2.8	3.3	7.2	1.1		15.5
03-82	2.2	1.1	5.0	5.0	3.8			17.1
04-82	1.1	1.7	4.4	6.1	3.3			16.6
05-82	5.5	2.2	1.7	3.9	3.8			17.1
06-82	5.5	2.2	6.1	1.7	1.1			16.6
TOTAL PERCENTAGE	16.5	8.3	23.9	25.5	23.1	2.7		100.0

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SILVER KING MINES, INC  
MORTON RANCH PROJECT

TABLE 7 LEVEL TWO (WD2) ATMOSPHERIC STABILITY BY  $\sigma_{\theta}$   
STABILITY CLASS

<u>Date</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>TOTAL</u>
01-82	0.6	0.6	0.6	7.2	7.8	0.6		17.4
02-82		0.6	1.1	2.2	9.4	2.2		15.5
03-82	1.1	1.1	2.2	5.1	6.7	1.1		17.3
04-82		2.2	5.0	3.3	5.0	1.1		16.6
05-82	4.4	0.6	3.3	6.1	2.2			16.6
06-82	1.7	3.3	5.0	4.4	2.2			16.6
Total Percent	7.8	8.4	17.2	28.3	33.3	5.0		100.0

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 8  $\Delta T$  ATMOSPHERIC STABILITY

STABILITY CLASS

<u>DATE</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>TOTAL</u>
01-82				1.1	8.8	6.6	0.6	17.1
02-82					9.9	4.4	1.1	15.4
03-82				1.7	14.9	0.5		17.1
04-82				3.3	10.5	2.2	0.6	16.6
05-82				6.1	9.4	1.7		17.2
06-82				2.8	12.7	1.1		16.6
TOTAL PERCENTAGE				15.0	66.2	16.5	2.3	100.0

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III. RADON-222

Radon-222 analyses for the ASVX1 through ASVX4 sites, ASVX5 (Box Creek Ranch), and ASVX6 (Douglas) are tabulated and shown in Table 9.

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TABLE 9 RADON-222 ANALYSIS

<u>Location</u>	<u>Date</u>	<u>Elapsed Time in Minutes</u>	<u>Rn-222 pCi/m<sup>3</sup></u>	<u>Error Estimate pCi/m<sup>3</sup></u>	<u>LLD pCi/m<sup>3</sup></u>
ASVX-1	01/11/82	8775	550	200	10
ASVX-2	01/11/82	8655	1260	450	10
ASVX-3	01/11/82	8650	720	260	10
ASVX-4	01/11/82	8760	870	310	10
ASVX-5	01/11/82	8660	1520	550	10
ASVX-6	01/11/82	8435	450	160	10
ASVX-1	02/02/82	8480	30	10	10
ASVX-2	02/02/82	8560	460	160	10
ASVX-3	02/02/82	8575	< 10	< 10	< 10
ASVX-4	02/02/82	8480	1340	480	10
ASVX-5	02/02/82	8560	260	90	10
ASVX-6	02/02/82	8535	1580	570	10
ASVX-1	03/02/82	8700	1500	600	10
ASVX-2	03/09/82	8490	200	100	10
ASVX-3	03/02/82	8585	3100	1100	10
ASVX-4	03/02/82	8655	1000	400	10
ASVX-5	03/02/82	8555	700	200	10
ASVX-6	03/02/82	8715	900	300	10
ASVX-1	04/07/82	8635	1200	400	10
ASVX-2	04/07/82	8735	2800	1000	10
ASVX-3	04/07/82	8705	< 10	< 10	< 10
ASVX-4	04/07/82	8660	2300	800	10
ASVX-5	04/07/82	8705	500	200	10
ASVX-6	04/07/82	8655	200	100	10

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TABLE 9 RADON-222 ANALYSIS

<u>Location</u>	<u>Date</u>	<u>Elapsed Time in Minutes</u>	<u>Rn-222 pCi/m<sup>3</sup></u>	<u>Error Estimate pCi/m<sup>3</sup></u>	<u>LLD pCi/m<sup>3</sup></u>
ASVX-1	05/07/82	8510	400	100	10
ASVX-2	05/07/82	8515	2700	1000	10
ASVX-3	05/07/82	8510	1900	700	10
ASVX-4	05/07/82	8770	1500	500	10
ASVX-5	05/07/82	8510	1500	600	10
ASVX-6	05/07/82	8540	< 10	< 10	< 10
ASVX-1	06/08/82	8545	< 10		10
ASVX-2	06/08/82	8600	190	70	10
ASVX-3	06/08/82	8565	< 10		10
ASVX-4	06/08/82	8555	< 10		10
ASVX-5	06/08/82	8545	600	200	10
ASVX-6	06/08/82	8950	210	80	10

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IV. GAMMA DOSE SURVEY

The results of gamma dose surveys conducted at the Hi and Low Volume air sampler sites ASVX1 through ASVX6 are shown in Table 10 .

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TABLE 10 FIELD GAMMA DOSE SURVEY - SOUTH MORTON

<u>Sample Location</u>	<u>Date &amp; Time</u>	<u>Instrument PIC Exposure Rate μR/hr.</u>	<u>Error Estimate μR/hr.</u>	<u>Instrument L-19 Exposure Rate μR/hr.</u>	<u>Error Estimate μR/hr.</u>
ASVX-1	3/31/82 9:00 AM	-----	-----	15.5	1.39
ASVX-2	3/31/82 11:45 AM	-----	-----	17.8	1.49
ASVX-3	3/31/82 10:15 AM	-----	-----	18.0	1.50
ASVX-4	3/31/82 9:40 AM	-----	-----	15.9	1.41
ASVX-5	3/31/82 12:20 PM	-----	-----	16.0	1.41
ASVX-6	3/31/82 1:50 PM	-----	-----	16.0	1.41

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TABLE 10 FIELD GAMMA DOSE SURVEY - SOUTH MORTON

<u>Sample Location</u>	<u>Date &amp; Time</u>	<u>Instrument PIC Exposure Rate μR/hr.</u>	<u>Error Estimate μR/hr.</u>	<u>Instrument L-19 Exposure Rate μR/hr.</u>	<u>Error Estimate μR/hr.</u>
ASVX1	*	----	----	----	----
ASVX2	*	----	----	----	----
ASVX3	*	----	----	----	----
ASVX4	*	----	----	----	----
ASVX5	*	----	----	----	----
ASVX6	*	----	----	----	----

\* Weather and soil conditions did not permit performance of the Gamma Dose Survey during the Second Quarter of 1982.

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V. GROUND WATER

The radiological and chemical analyses of Monitor Well Nos. MW1 through MW11, and Water Well Nos. WW1 through WW4, are shown in Table 11 and Table 12 respectively. The Monitor Well Nos. MW1 and MW2, were dry during this report period and no sample could be obtained for analysis.

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW3			Sample Location MW4		
	Sample Date 2/24/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 2/22/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	0.49		0.07	40.0		0.07
Ra-226 (dis)	0.5	0.2	0.2	1.0	0.2	0.2
Th-230 (dis)	0.1	0.1	0.1	0.0	0.2	0.5
Pb-210 (dis)	0.5	0.8	0.5	0.7	0.9	0.5
Po-210 (dis)	0.3	0.5	0.2	0.0	0.1	0.2

Parameters	Sample Location MW5			Sample Location MW6		
	Sample Date 2/24/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 2/18/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	109		0.07	21.8		0.07
Ra-226 (dis)	1.2	0.2	0.2	0.9	0.2	0.2
Th-230 (dis)	8.0	1.1	0.2	0.2	0.1	0.1
Pb-210 (dis)	0.0	0.2	0.5	0.2	0.5	0.5
Po-210 (dis)	0.3	0.5	0.2	0.1	0.2	0.1

\* Error Estimate at the 95% confidence level.

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW7			Sample Location MW8		
	Sample Date 2/17/82	Error* Estimate pCi/l	LLD pCi/l	Sample Date 2/11/82	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	141		0.07	2.2		0.07
Ra-226 (dis)	3.6	0.3	0.2	0.7	0.2	0.2
Th-230 (dis)	2.1	0.6	0.3	0.2	0.2	0.3
Pb-210 (dis)	34.9	6.0	0.5	0.2	0.6	0.5
Po-210 (dis)	0.2	0.4	0.2	0.0	0.1	0.2

Parameters	Sample Location MW9			Sample Location MW10		
	Sample Date Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	21		0.07	55		0.07
Ra-226 (dis)	0.6	0.2	0.2	0.5	0.1	0.2
Th-230 (dis)	0.0	0.1	0.2	1.3	0.2	0.1
Pb-210 (dis)	1.2	0.6	0.6	2.1	0.5	0.5
Po-210 (dis)	0.0	0.1	0.1	0.2	0.4	0.1

\* Error Estimate at the 95% confidence level.

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

<u>Parameters</u>	<u>Sample Location MW11</u> <u>Sample Date 2/12/82</u> <u>Concentration pCi/l</u>	<u>Error*</u> <u>Estimate</u> <u>pCi/l</u>	<u>LLD</u> <u>pCi/l</u>
Unat (dis)	66.6		0.07
Ra-226 (dis)	0.9	0.1	0.1
Th-230 (dis)	1.7	0.4	0.2
Pb-210 (dis)	0.4	0.7	0.4
Po-210 (dis)	0.4	0.6	0.1

\*Error Estimate at the 95% confidence level.

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TABLE 11 CHEMICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW3	Sample Location MW4	Sample Location MW5	Sample Location MW6
	Sample Date 2/24/82 Concentration mg/l	Sample Date 2/22/82 Concentration mg/l	Sample Date 2/24/82 Concentration mg/l	Sample Date 2/18/82 Concentration mg/l
Arsenic	<0.075	0.077	<0.075	0.0793
Chloride	3	3	5	2
Iron	<0.008	<0.008	<0.008	<0.008
Manganese	0.016	0.013	0.004	0.0092
Nitrate as N	0.1	0.24	1.04	<0.1
pH	6.9	6.7	6.7	6.7
Selenium	<0.075	0.0152	0.2254	<0.075
Sulfate	42	49	36	60
Static Level	103.68	131.11	114.86	91.33
TDS	231.20	202.4	200.0	200.0

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TABLE 11 CHEMICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW7 Sample Date 2-17-82 Concentration mg/l	Sample Location MW8 Sample Date 2-11-82 Concentration mg/l	Sample Location MW9 Sample Date 2-10-82 Concentration mg/l	Sample Location MW10 Sample Date 2-10-82 Concentration mg/l
Arsenic	<0.075	0.095	<0.075	<0.075
Chloride	5	5	5	4
Iron	<0.008	<0.008	<0.008	<0.008
Manganese	0.041	0.032	0.003	0.039
Nitrate as N	<0.1	<0.1	0.122	0.1
pH	6.9	6.8	6.8	6.7
Selenium	<0.075	<0.075	<0.075	<0.075
Sulfate	54	72	70	71
Static Level	65.4	65.6	68.4	103.3
TDS	54	72	70	71

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TABLE 11 CHEMICAL ANALYSIS OF MONITOR WELLS

<u>Parameters</u>	<u>Sample Location MW11</u> <u>Sample Date 2/12/82</u> <u>Concentration mg/l</u>	<u>Sample Location</u> <u>Sample Date</u> <u>Concentration mg/l</u>	<u>Sample Location</u> <u>Sample Date</u> <u>Concentration mg/l</u>	<u>Sample Location</u> <u>Sample Date</u> <u>Concentration mg/l</u>
Arsenic	0.1008			
Chloride	9			
Iron	<0.008			
Manganese	0.0707			
Nitrate as N	0.016			
pH	6.6			
Selenium	<0.075			
Sulfate	97.61			
Static Level	19.0			
TDS	202			

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW3			Sample Location MW4		
	Sample Date 6/30/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 6/29/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	1.08		0.07	20.4		0.07
Ra-226 (dis)	0.2	0.1	0.1	1.1	0.2	0.1
Th-230 (dis)	0.2	0.2	0.1	0.2	0.2	0.1
Pb-210 (dis)	* *	* *	* *	* *	* *	* *
Po-210 (dis)	* *	* *	* *	* *	* *	* *

Parameters	Sample Location MW5			Sample Location MW6		
	Sample Date 6/11/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 6/7/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	406		0.07	22.7		0.07
Ra-226 (dis)	0.7	0.2	0.2	0.6	0.1	0.1
Th-230 (dis)	1.3	0.5	0.1	1.3	1.1	0.4
Pb-210 (dis)	* *	* *	* *	* *	* *	* *
Po-210 (dis)	* *	* *	* *	* *	* *	* *

\* Error Estimate at the 95% confidence level.

\*\* Analyzed 1st & 3rd Quarters Only (Semi-Annually)

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW7			Sample Location MW8		
	Sample Date 6/23/82	Error* Estimate	LLD	Sample Date 6/7/82	Error* Estimate	LLD
	Concentration pCi/l	pCi/l	pCi/l	Concentration pCi/l	pCi/l	pCi/l
Unat (dis)	29.8		0.07	19.5		0.07
Ra-226 (dis)	3.3	0.3	0.1	0.5	0.1	0.1
Th-230 (dis)	0.3	0.3	0.1	0.1	0.1	0.1
Pb-210 (dis)	* *	* *	* *	* *	* *	* *
Po-210 (dis)	* *	* *	* *	* *	* *	* *

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Parameters	Sample Location MW9			Sample Location MW10		
	Sample Date 6/9/82	Error* Estimate	LLD	Sample Date 6/10/82	Error* Estimate	LLD
	Concentration pCi/l	pCi/l	pCi/l	Concentration pCi/l	pCi/l	pCi/l
Unat (dis)	35.4		0.07	75.7		0.07
Ra-226 (dis)	0.5	0.1	0.1	0.7	0.1	0.1
Th-230 (dis)	0.9	0.4	0.1	0.4	0.3	0.1
Pb-210 (dis)	* *	* *	* *	* *	* *	* *
Po-210 (dis)	* *	* *	* *	* *	* *	* *

\* Error Estimate at the 95% confidence level.  
\*\* Analyzed 1st & 3rd Quarters Only (Semi-Annually)

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

<u>Parameters</u>	<u>Sample Location MW11</u> <u>Sample Date 6/1/82</u> <u>Concentration pCi/l</u>	<u>Error*</u> <u>Estimate</u> <u>pCi/l</u>	<u>LLD</u> <u>pCi/l</u>
Unat (dis)	29.6		0.07
Ra-226 (dis)	0.8	0.1	0.1
Th-230 (dis)	0.0	0.1	0.1
Pb-210 (dis)	* *	* *	* *
Po-210 (dis)	* *	* *	* *

\*Error Estimate at the 95% confidence level.

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TABLE 11 CHEMICAL ANALYSIS OF MONITOR WELLS

<u>Parameters</u>	<u>Sample Location MW3</u> Sample Date 6/30/82 <u>Concentration mg/l</u>	<u>Sample Location MW4</u> Sample Date 6/29/82 <u>Concentration mg/l</u>	<u>Sample Location MW5</u> Sample Date 6/11/82 <u>Concentration mg/l</u>	<u>Sample Location MW6</u> Sample Date 6/7/82 <u>Concentration mg/l</u>
Arsenic	<0.075	<0.075	<0.075	<0.075
Chloride	3	2	3	2
Iron	<0.008	<0.008	<0.008	<0.008
Manganese	0.053	0.012	<0.002	0.003
Nitrate as N	<0.1	<0.1	0.95	<0.1
pH	7.6	7.4	7.5	6.4
Selenium	<0.075	<0.075	0.210	<0.075
Sulfate	23.54	18.60	15.14	20.74
Static Level	103.65	131.08	114.02	91.31
TDS	248	242	386	218

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TABLE 11 CHEMICAL ANALYSIS OF MONITOR WELLS

<u>Parameters</u>	<u>Sample Location MW7</u> Sample Date 6/23/82 <u>Concentration mg/l</u>	<u>Sample Location MW8</u> Sample Date 6/7/82 <u>Concentration mg/l</u>	<u>Sample Location MW9</u> Sample Date 6/9/82 <u>Concentration mg/l</u>	<u>Sample Location MW10</u> Sample Date 6/10/82 <u>Concentration mg/l</u>
Arsenic	<0.075	<0.075	<0.075	<0.075
Chloride	3	4	4	3
Iron	<0.008	<0.008	<0.008	<0.008
Manganese	0.035	0.042	0.069	0.046
Nitrate as N	<0.1	<0.1	0.16	<0.1
pH	7.9	6.6	7.7	7.5
Selenium	<0.075	<0.075	<0.075	<0.075
Sulfate	35.94	33.47	32.37	34.84
Static Level	66.0	65.6	68.65	101.61
TDS	225	226	246	218

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TABLE 11 CHEMICAL ANALYSIS OF MONITOR WELLS

<u>Parameters</u>	<u>Sample Location MW11</u> <u>Sample Date 6/1/82</u> <u>Concentration mg/l</u>	<u>Sample Location</u> <u>Sample Date</u> <u>Concentration mg/l</u>	<u>Sample Location</u> <u>Sample Date</u> <u>Concentration mg/l</u>	<u>Sample Location</u> <u>Sample Date</u> <u>Concentration mg/l</u>
Arsenic	<0.075			
Chloride	8			
Iron	0.049			
Manganese	0.064			
Nitrate as N	<0.1			
pH	6.7			
Selenium	<0.075			
Sulfate	30.73			
Static Level	18.78			
TDS	258			

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TABLE 12 RADIOLOGICAL ANALYSIS OF WATER WELLS

Parameters	Sample Location WW-1			Sample Location WW-2		
	Sample Date 3/3/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 3/3/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	374		0.07	12.5		0.07
Ra-226 (dis)	0.4	0.2	0.1	0.8	0.3	0.1
Th-230 (dis)	16.0	1.8	0.3	1.0	0.3	0.2
Pb-210 (dis)	2.1	1.4	0.5	2.7	1.7	0.5
Po-210 (dis)	0.3	0.4	0.1	0.2	0.4	0.1
Unat (sus)						
Ra-226 (sus)	0.0	0.1	0.1	0.0	0.1	0.1
Th-230 (sus)	0.2	0.2	0.2	0.1	0.2	0.2
Pb-210 (sus)	0.4	0.4	0.5	0.3	0.5	0.6
Po-210 (sus)	0.0	0.2	0.1	0.2	0.2	0.1

\*Error Estimate at the 95% confidence level.

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TABLE 12 RADIOLOGICAL ANALYSIS OF WATER WELLS

Parameters	Sample Location WW3			Sample Location WW4		
	Sample Date 2/16/82	Error* Estimate pCi/l	LLD pCi/l	Sample Date 2/17/82	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	2.0		0.07	<0.07		0.07
Ra-226 (dis)	0.4	0.1	0.1	1.2	0.2	0.2
Th-230 (dis)	0.0	0.1	0.1	0.2	0.4	0.5
Pb-210 (dis)	0.3	0.2	0.1	0.0	0.2	0.5
Po-210 (dis)	0.0	0.1	0.1	0.0	0.1	0.1
Unat (sus)	0.10		0.07	0.1	0.1	0.1
Ra-226 (sus)	0.0	0.1	0.1	0.0	0.1	0.1
Th-230 (sus)	0.0	0.1	0.1	0.3	0.4	0.5
Pb-210 (sus)	0.4	0.2	0.1	0.1	0.2	0.1
Po-210 (sus)	0.1	0.2	0.2	0.0	0.1	0.1

\*Error Estimate at the 95% confidence level.

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TABLE 12 CHEMICAL ANALYSIS OF WATER WELLS

<u>Parameters</u>	<u>Sample Location WW1</u> <u>Sample Date 3/3/82</u> <u>Concentration mg/l</u>	<u>Sample Location WW2</u> <u>Sample Date 3/3/82</u> <u>Concentration mg/l</u>	<u>Sample Location WW3</u> <u>Sample Date 2/16/82</u> <u>Concentration mg/l</u>	<u>Sample Location WW4</u> <u>Sample Date 2/17/82</u> <u>Concentration mg/l</u>
Arsenic	0.0940	0.085	<0.075	0.0973
Chloride	2	3	3	6
Iron	<0.008	<0.008	<0.008	<0.008
Manganese	0.013	0.004	0.040	0.188
Nitrate as N	0.007	0.134	0.007	0.054
pH	7.0	7.1	6.9	7.0
Selenium	<0.075	<0.075	<0.075	<0.011
Sulfate	123	265	141	165
Static Level	N/A	N/A	139.8	56.86
TDS	170	246	242	378

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TABLE 12 RADIOLOGICAL ANALYSIS OF WATER WELLS

Parameters	Sample Location WW-1			Sample Location WW-2		
	Sample Date 5/28/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 5/26/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	0.6	0.1	0.1	33.0		0.07
Ra-226 (dis)	0.6	0.1	0.1	1.4	0.2	0.1
Th-230 (dis)	0.2	0.2	0.1	0.1	0.1	0.1
Pb-210 (dis)	* *	* *	* *	* *	* *	* *
Po-210 (dis)	* *	* *	* *	* *	* *	* *
Unat (sus)	<0.07		0.07	<0.07	0.1	0.07
Ra-226 (sus)	0.1	0.1	0.1	0.0	0.1	0.1
Th-230 (sus)	-0.1	0.3	0.3	0.1	0.2	0.1
Pb-210 (sus)	* *	* *	* *	* *	* *	* *
Po-210 (sus)	* *	* *	* *	* *	* *	* *

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\*Error Estimate at the 95% confidence level.

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TABLE 12 RADIOLOGICAL ANALYSIS OF WATER WELLS

Parameters	Sample Location WW-3			Sample Location WW-4		
	Sample Date 6/23/82	Error* Estimate	LLD	Sample Date 6/11/82	Error* Estimate	LLD
	Concentration pCi/l	pCi/l	pCi/l	Concentration pCi/l	pCi/l	pCi/l
Unat (dis)	1.2		0.07	1.1		0.07
Ra-226 (dis)	0.5	0.1	0.1	0.6	0.1	0.1
Th-230 (dis)	0.0	0.1	0.2	0.6	0.3	0.1
Pb-210 (dis)	* *	* *	* *	* *	* *	* *
Po-210 (dis)	* *	* *	* *	* *	* *	* *
Unat (sus)	1.8		0.07	1.5		0.07
Ra-226 (sus)	0.1	0.1	0.1	0.1	0.1	0.1
Th-230 (sus)	0.1	0.1	0.1	-0.1	0.1	0.1
Pb-210 (sus)	* *	* *	* *	* *	* *	* *
Po-210 (sus)	* *	* *	* *	* *	* *	* *

\*Error Estimate at the 95% confidence level.

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TABLE 12 CHEMICAL ANALYSIS OF WATER WELLS

Parameters	Sample Location WW1 Sample Date 5-28-82 Concentration mg/l	Sample Location WW2 Sample Date 5-26-82 Concentration mg/l	Sample Location WW3 Sample Date 6-23-82 Concentration mg/l	Sample Location WW4 Sample Date 6-11-82 Concentration mg/l
Arsenic	<0.075	<0.075	<0.075	<0.075
Chloride	2	4	3	6
Iron	<0.008	<0.008	<0.008	1.03
Manganese	0.012	0.008	0.034	0.210
Nitrate as N	<0.1	0.22	<0.1	<0.1
pH	7.2	6.4	7.7	7.7
Selenium	<0.075	<0.075	<0.075	<0.075
Sulfate	22.39	51.03	45.92	122.46
Static Level	N/A	N/A	139.66	57.33
TDS	453	542	357	654

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V. GROUNDWATER (continued)

Analytical results which were not received from the commercial laboratory prior to submittal of the January Pre-Operational Report.

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TABLE 11 RADIOLOGICAL ANALYSIS OF MONITOR WELLS

Parameters	Sample Location MW-3 Sample Date 11-17-81			Sample Location MW-4 Sample Date 11-16-81		
	Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	1.2		0.07	16		0.07
Ra-226 (dis)	0.3	0.2	0.2	0.9	0.2	0.1
Th-230 (dis)	0.0	0.1	0.2	-0.1	0.2	0.2
Pb-210 (dis)	**	**	**	**	**	**
Po-210 (dis)	**	**	**	**	**	**
Gross Alpha (total)	6	2	2	20	4	2

Parameters	Sample Location MW-5 Sample Date 12-10-81			Sample Location MW-6 Sample Date 11-30-81		
	Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	367		0.07	38.1		0.07
Ra-226 (dis)	2.2	0.3	0.1	0.5	0.2	0.1
Th-230 (dis)	2.1 ***	0.3 ***	0.1 ***	-0.2	0.2	0.3
Pb-210 (dis)	**	**	**	**	**	**
Po-210 (dis)	**	**	**	**	**	**
Gross Alpha (total)	580	60	18	31	5	2

\* Error Estimate at the 95% confidence level.

\*\* Analyzed 1st & 3rd Quarters only. (semi-annually)

\*\*\* Analytical results not received prior to January Pre-Operational Report

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TABLE 12 RADIOLOGICAL ANALYSIS OF WATER WELLS

Parameters	Sample Location WW-3			Sample Location WW-4		
	Sample Date 12-8-81 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 11-4-81 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	<0.07***		0.07***	0.9		0.07
Ra-226 (dis)	0.3 ***	0.1***	0.1 ***	0.7	.02	.1
Th-230 (dis)	0.1 ***	0.1***	0.2 ***	0.6	0.2	.2
Pb-210 (dis)	**	**	**	**	**	**
Po-210 (dis)	**	**	**	**	**	**
Unat (sus)	<0.07***		0.07***	0.3		0.07
Ra-226 (sus)	0.2 ***	0.1***	0.1 ***	0.2	0.1	.1
Th-230 (sus)	0.0 ***	0.2***	0.2 ***	0.0	0.2	.3
Pb-210 (sus)	**	**	**	**	**	**
Po-210 (sus)	**	**	**	**	**	**

\*Error Estimate at the 95% confidence level.

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\*\*\* Analytical results not received prior to January Pre-Operational Report

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VI. SURFACE WATER

The results of radiological and chemical analyses of surface water collected at the surface water sites SWS2 through SWS6 are listed in Table 13.

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

Parameters	Sample Location SWS-2	Error*		Sample Location SWS-3	Error*	
	Sample Date 1/29/82 Concentration pCi/l	Estimate pCi/l	LLD pCi/l	Sample Date 1/28/82 Concentration pCi/l	Estimate pCi/l	LLD pCi/l
Unat (dis)	<0.07		0.07	**	**	**
Ra-226 (dis)	0.8	0.2	0.1	**	**	**
Th-230 (dis)	0.2	0.1	0.1	**	**	**
Pb-210 (dis)	0.8	0.6	0.3	**	**	**
Po-210 (dis)	0.2	0.3	0.1	**	**	**
Unat (sus)	<0.07		0.07	**	**	**
Ra-226 (sus)	0.2	0.2	0.4	**	**	**
Th-230 (sus)	0.1	0.1	0.1	**	**	**
Pb-210 (sus)	0.2	0.3	0.2	**	**	**
Po-210 (sus)	0.0	0.1	0.1	**	**	**
TSS	32.0			**	**	**

\* Error estimate at the 95% confidence level.

\*\* Insufficient Sample

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

Parameters	Sample Location SWS-4	Error*	LLD pCi/l	Sample Location SWS-5	Error*	LLD pCi/l
	Sample Date 1/28/82 Concentration pCi/l	Estimate pCi/l		Sample Date 2/1/82 Concentration pCi/l	Estimate pCi/l	
Unat (dis)	<0.07		0.07	<0.07		0.07
Ra-226 (dis)	2.3	0.2	0.3	0.1	0.2	0.3
Th-230 (dis)	0.6	0.3	0.1	0.0	0.1	0.1
Pb-210 (dis)	0.4	0.2	0.1	0.0	0.4	0.1
Po-210 (dis)	0.1	0.1	0.1	0.0	0.2	0.1
Unat (sus)	<0.07		0.07	<0.07		0.07
Ra-226 (sus)	0.5	0.2	0.4	0.9	0.2	0.3
Th-230 (sus)	0.0	0.1	0.1	-0.1	0.1	0.1
Pb-210 (sus)	-0.1	0.2	0.2	0.0	0.2	0.2
Po-210 (sus)	0.1	0.1	0.1	0.2	0.2	0.1
TSS	49.0			49.0		

\* Error estimate at the 95% confidence level.

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

Parameters	Sample Location SWS-6 Sample Date 1/29/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	<0.07		0.07
Ra-226 (dis)	0.6	0.2	0.3
Th-230 (dis)	0.2	0.1	0.1
Pb-210 (dis)	-0.2	0.4	0.2
Po-210 (dis)	0.0	0.2	0.1
Unat (sus)	<0.07		0.07
Ra-226 (sus)	0.8	0.2	0.3
Th-230 (sus)	0.1	0.1	0.1
Pb-210 (sus)	0.1	0.2	0.2
Po-210 (sus)	0.0	0.1	0.1
Gross Alpha (total)	131.0		

\* Error estimate at the 95% confidence level.

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

Parameters	Sample Location SWS-2			Sample Location SWS-3		
	Sample Date 4/15/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 4/13/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	36.7		0.7	**	**	**
Ra-226 (dis)	0.6	0.4	0.3	**	**	**
Th-230 (dis)	0.5	0.5	0.2	**	**	**
Pb-210 (dis)	***	***	***	**	**	**
Po-210 (dis)	0.0	0.1	0.1			
Unat (sus)	<0.07		<0.07	**	**	**
Ra-226 (sus)	0.0	0.1	0.1	**	**	**
Th-230 (sus)	0.1	0.2	0.1	**		
Pb-210 (sus)	***	***	***	**	**	**
Po-210 (sus)	0.5	0.3	0.1	**	**	**
TSS	3.2			**		

\* Error estimate at the 95% confidence level.

\*\* Insufficient Sample.

\*\*\* Analysis not complete - will be reported in next report.

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

Parameters	Sample Location SWS-4			Sample Location SWS-5		
	Sample Date 4/8/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l	Sample Date 4/8/82 Concentration pCi/l	Error* Estimate pCi/l	LLD pCi/l
Unat (dis)	244.6		0.07	139.8		0.07
Ra-226 (dis)	0.8	0.4	0.3	0.4	0.3	0.3
Th-230 (dis)	1.2	0.7	0.2	0.7	0.4	0.1
Pb-210 (dis)	***	***	***	***	***	***
Po-210 (dis)	0.0	0.1	0.1	0.4	0.3	0.1
Unat (sus)	<0.07		<0.07	2.7		0.07
Ra-226 (sus)						
Th-230 (sus)	0.4	0.3	0.1	0.0	0.1	0.1
Pb-210 (sus)	***	***	***	***	***	***
Po-210 (sus)	0.0	0.1	0.1	0.0	0.1	0.1
TSS	4.4			29.6		

\* Error estimate at the 95% confidence level.

\*\*\* Analysis not complete - will be reported in next report.

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

<u>Parameters</u>	<u>Sample Location SWS-6</u> <u>Sample Date 4/12/62</u> <u>Concentration pCi/l</u>	<u>Error*</u> <u>Estimate</u> <u>pCi/l</u>	<u>LLD</u> <u>pCi/l</u>
Unat (dis)	34.1		0.07
Ra-226 (dis)	0.1	0.2	0.2
Th-230 (dis)	0.1	0.2	0.2
Pb-210 (dis)	***	***	***
Po-210 (dis)	0.0	0.1	0.1 <sub>cc</sub>
Unat (sus)	18.2		0.07
Ra-226 (sus)	0.0	0.1	0.1
Th-230 (sus)	0.1	0.2	0.1
Pb-210 (sus)	***	***	***
Po-210 (sus)	0.5	0.3	0.1
TSS	74.8		

\* Error estimate at the 95% confidence level.

\*\*\* Analysis not complete will be reported in next report.

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VI. SURFACE (continued)

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TABLE 13 RADIOLOGICAL ANALYSIS OF SURFACE WATER

Parameters	Sample Location SWS-4			Sample Location SWS-5		
	Sample Date 11-20-81	Error* Estimate	LLD	Sample Date 12-18-81	Error* Estimate	LLD
	Concentration pCi/l	pCi/l	pCi/l	Concentration pCi/l	pCi/l	pCi/l
Unat (dis)	442		0.7	0.11***		0.07
Ra-226 (dis)	0.3	0.2	0.1	0.1 ***	0.1	0.1
Th-230 (dis)	46	2	0.4	3.1 ***	0.5	0.2
Pb-210 (dis)	**	**	**	**	**	**
Po-210 (dis)	**	**	**	**	**	**
Unat (sus)	0.95		0.07	<0.07***		
Ra-226 (sus)	0.2	0.2	0.2	0.1 ***	0.1	0.07
Th-230 (sus)	0.1	0.1	0.2	0.2 ***	0.2	0.2
Pb-210 (sus)	**	**	**	**	**	**
Po-210 (sus)	**	**	**	**	**	**

\* Error estimate at the 95% confidence level.

\*\* Analyzed 1st & 3rd Quarters Only (Semi-annually)

\*\*\* Analytical results not received prior to January Pre-Operational Report

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VII. SOIL

The results of radiological analyses of surface soil samples collected at the Hi and Low Volume air sampler sites ASVX1 through ASVX6 are presented in Table 14.

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TABLE 14 RADIOLOGICAL ANALYSIS OF SOIL SAMPLES

Parameters	Sample Location ASVX1			Sample Location ASVX2		
	Sample Date 4/23/82	Error* Estimate	LLD	Sample Date 6/22/82	Error* Estimate	LLD
	Concentration pCi/G	pCi/G	pCi/G	Concentration pCi/G	pCi/G	pCi/G
Unat	0.8		0.07	2.4		0.07
Ra-226	1.4	0.1	0.01	1.4	0.1	0.01
Th-230	0.7	0.3	0.03	0.9	0.3	0.03
Pb-210	0.7	0.2	0.01	0.8	0.2	0.01

Parameters	Sample Location ASVX3			Sample Location ASVX4		
	Sample Date 6/22/82	Error* Estimate	LLD	Sample Date 4/23/82	Error* Estimate	LLD
	Concentration pCi/G	pCi/G	pCi/G	Concentration pCi/G	pCi/G	pCi/G
Unat	2.8		0.07	1.9		0.07
Ra-226	1.9	0.1	0.01	0.7	0.1	0.02
Th-230	0.2	0.1	0.03	0.6	0.2	0.03
Pb-210	1.8	0.4	0.01	0.2	0.1	0.01

\* Error Estimate at the 95% confidence level.

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TABLE 14 RADIOLOGICAL ANALYSIS OF SOIL SAMPLES

Parameters	Sample Location ASVX5			Sample Location ASVX6		
	Sample Date 6/22/82 Concentration pCi/G	Error* Estimate pCi/G	LLD pCi/G	Sample Date 6/28/82 Concentration pCi/G	Error* Estimate pCi/G	LLD pCi/G
Unat	0.2		0.07	<0.07		0.07
Ra-226	0.8	0.1	0.01	0.8	0.1	0.01
Th-230	0.2	0.1	0.02	0.2	0.1	0.02
Pb-210	1.2	0.3	0.03	8.3	1.7	0.03

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\* Error Estimate at the 95% confidence level.

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VIII. VEGETATION

Tabulated radiological analyses of vegetation samples collected at grazing areas near the Hi Volume air sampler sites ASVX1 through ASVX4 are presented in Table 15.

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TABLE 15 RADIOLOGICAL ANALYSIS OF VEGETATION SAMPLES

Parameters	Sample Location ASVX1			Sample Location ASVX2		
	Sample Date 6/22/82	Error* Estimate	LLD	Sample Date 6/22/82	Error* Estimate	LLD
	Concentration pCi/Kg	pCi/Kg	pCi/Kg	Concentration pCi/Kg	pCi/Kg	pCi/Kg
Unat (as U) Total	10.0		0.7	6.0		0.7
Ra-226 (Total)	34	4	3	72	3	2
Th-230 (Total)	4.0	1.0	1.0	7.6	1.2	1.0
Pb-210 (Total)	141	3	2	56	2	2
Po-210 (Total)	49	2	2	13	1	1
Ash (500° C) %	9.3			11.1		
Air Dry Loss (%)	61			60		

Parameters	Sample Location ASVX3			Sample Location ASVX4		
	Sample Date 6-22-82	Error* Estimate	LLD	Sample Date 6-22-82	Error* Estimate	LLD
	Concentration pCi/Kg	pCi/Kg	pCi/Kg	Concentration pCi/Kg	pCi/Kg	pCi/Kg
Unat (as U) Total	12.6		0.7	18.9		0.7
Ra-226 (Total)	65	1	1	44	2	2
Th-230 (Total)	3.6	0.5	0.4	1.4	0.4	0.3
Pb-210 (Total)	173	8	4	154	7	3
Po-210 (Total)	25	2	1	27	1	1
Ash (500° C) (%)	7.3			6.9		
Air Dry Loss (%)	52			58		

\* Error Estimate at the 95% confidence level.

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IX. SUPPLEMENTAL INFORMATIONA. Calibration Data

The calibration data for the Hi Volume air samplers ASVX1 through ASVX4 and Low Volume air samplers ASVX5 and ASVX6 are tabulated and presented in Table 16 and Table 17 respectively.

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Figure 1

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Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project  
 Orifice Unit No. 8050880 Calibrated by: J.L.M. - E.M.L.  
 Sampler No. ASVX #1 Date 1/25/82  
 Indicator No. 34137  $Q_r = aI \pm b$   
 (Rotameter/Recorder)  $Q_r =$  0.0269159 I 0.2130548  
 Correlation coefficient of r = 0.9881904

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		Indicator Reading	$Q_r$ Flow Rate* cmm
		Left	Total		
1	18	5.1	9.85	48	1.505
		4.75			
2	13	4.4	8.45	45.5	1.438
		4.05			
3	10	3.9	7.05	40	1.290
		3.15			
4	7	2.85	5.00	32	1.074
		2.15			
5	5	1.5	2.65	22.5	.819
		1.15			
6					
7					
Dup-1	18	5.15	9.95	51	1.586
		4.8			
Dup-2	13	4.5	8.6	46	1.451
		4.1			

\*Flow rate from orifice unit calibration chart or equation.

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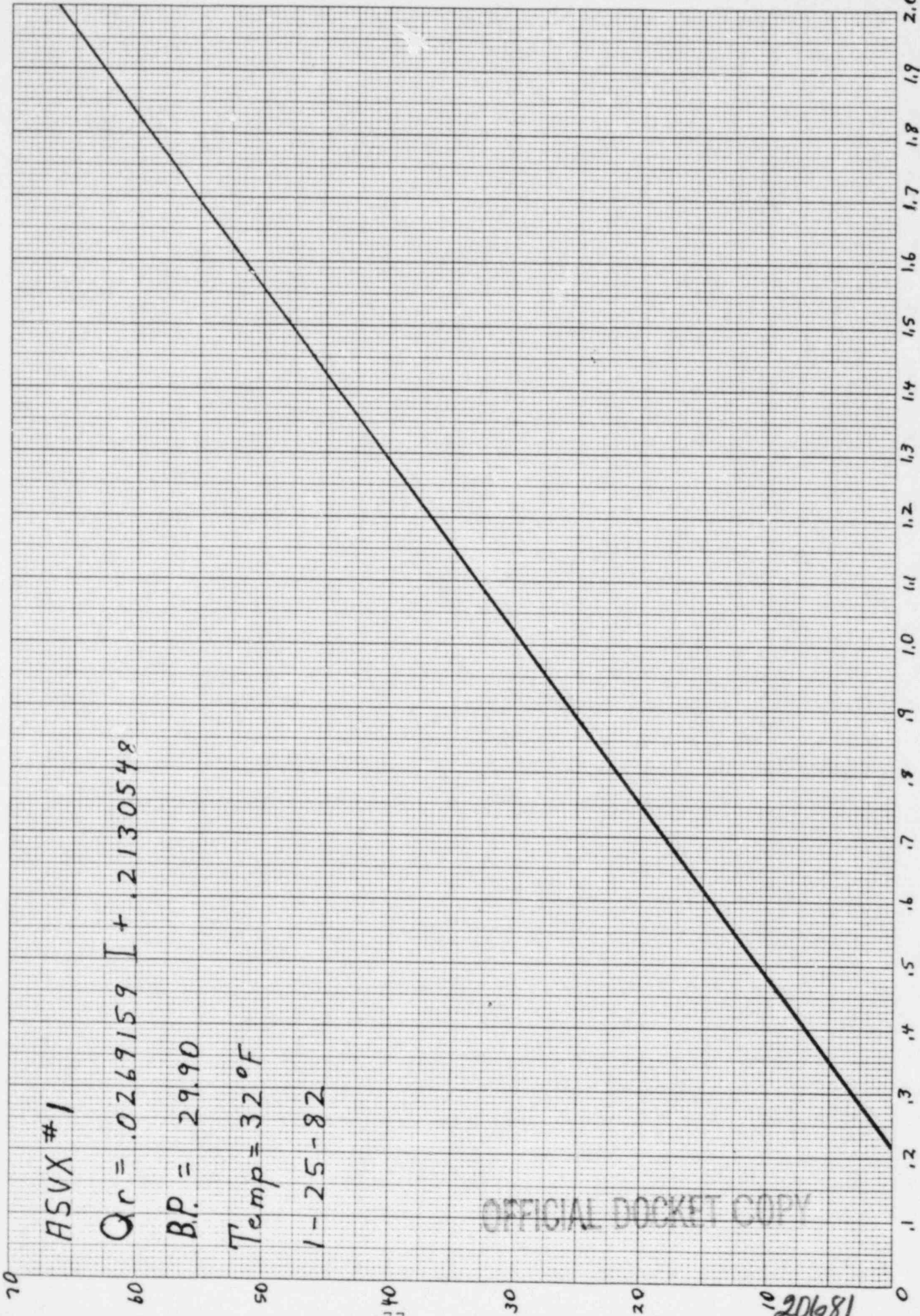
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Table 16

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10 X 10 TO 1/2 INCH 7 X 10 INCHES  
KEUFFEL & ESSER CO. MADE IN U.S.A.



ASVX #1

Qr = .0269159 I + .2130548

B.P. = 29.90

Temp = 32°F

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Figure 1

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Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project  
 Orifice Unit No. 8050880 Calibrated by: J.L.M.  
 Sampler No. ASVX #1 Date 4/21/82  
 Indicator No. 34137  $Q_r = aI \pm b$   
 (Rotameter/Recorder)  $Q_r = .0301153 I + .0551421$   
 Correlation coefficient  
 of  $r = .9938502$

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		I Indicator Reading	$Q_r$ Flow Rate* cmm
		Left Right	Total		
1	18	5.4	10.25	50	1.561
		4.85			
2	13	4.45	8.60	46	1.440
		4.15			
3	10	3.6	6.9	40	1.260
		3.3			
4	7	2.45	4.65	32.5	1.034
		2.2			
5	5	1.5	2.8	26	.838
		1.3			
6					
7					
Dup-1	18	5.45	10.35	51	1.591
		4.9			
Dup-2	13	4.5	8.70	47.5	1.486
		4.2			

\*Flow rate from orifice unit calibration chart or equation.

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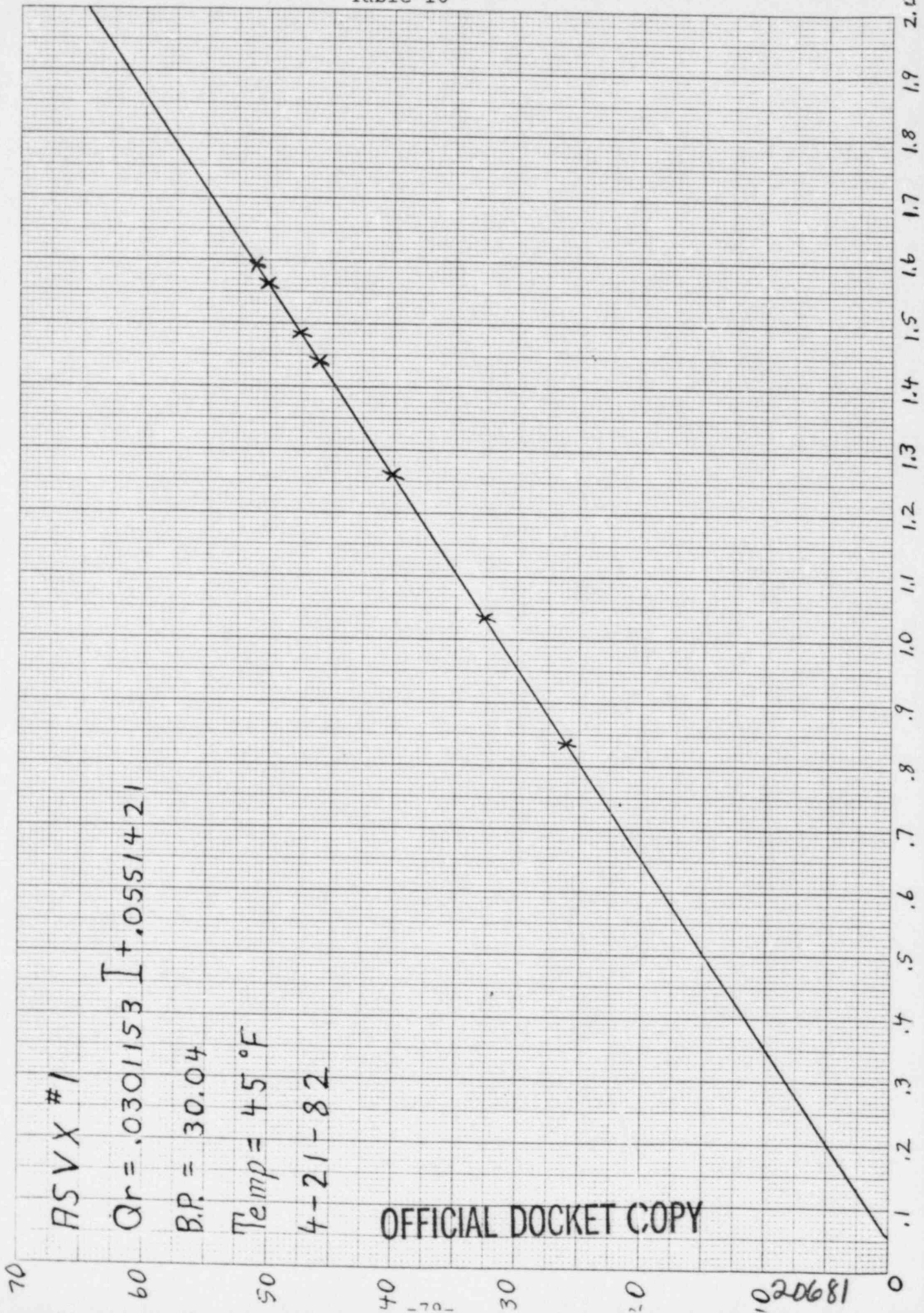
04009602121E

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Table 16

10 X 10 TO 1/2 INCH KEUFFEL & ESSER CO. MADE IN U.S.A.

46 1320



ASVX #1

QR = .0301153 I + .0551421

B.P. = 30.04

Temp = 45 °F

4-21-82

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Figure 1

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Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project

Orifice Unit No. 8050880

Calibrated by: J.L.M. - E.M.L.

Sampler No. ASVX #2

Date 1/25/82

Indicator No. 34094  
(Rotameter/Recorder)

$Q_r = aI \pm b$  \_\_\_\_\_

Correlation coefficient  
of  $r =$  1.0088643

$Q_r =$  .0354035 I - .3317697

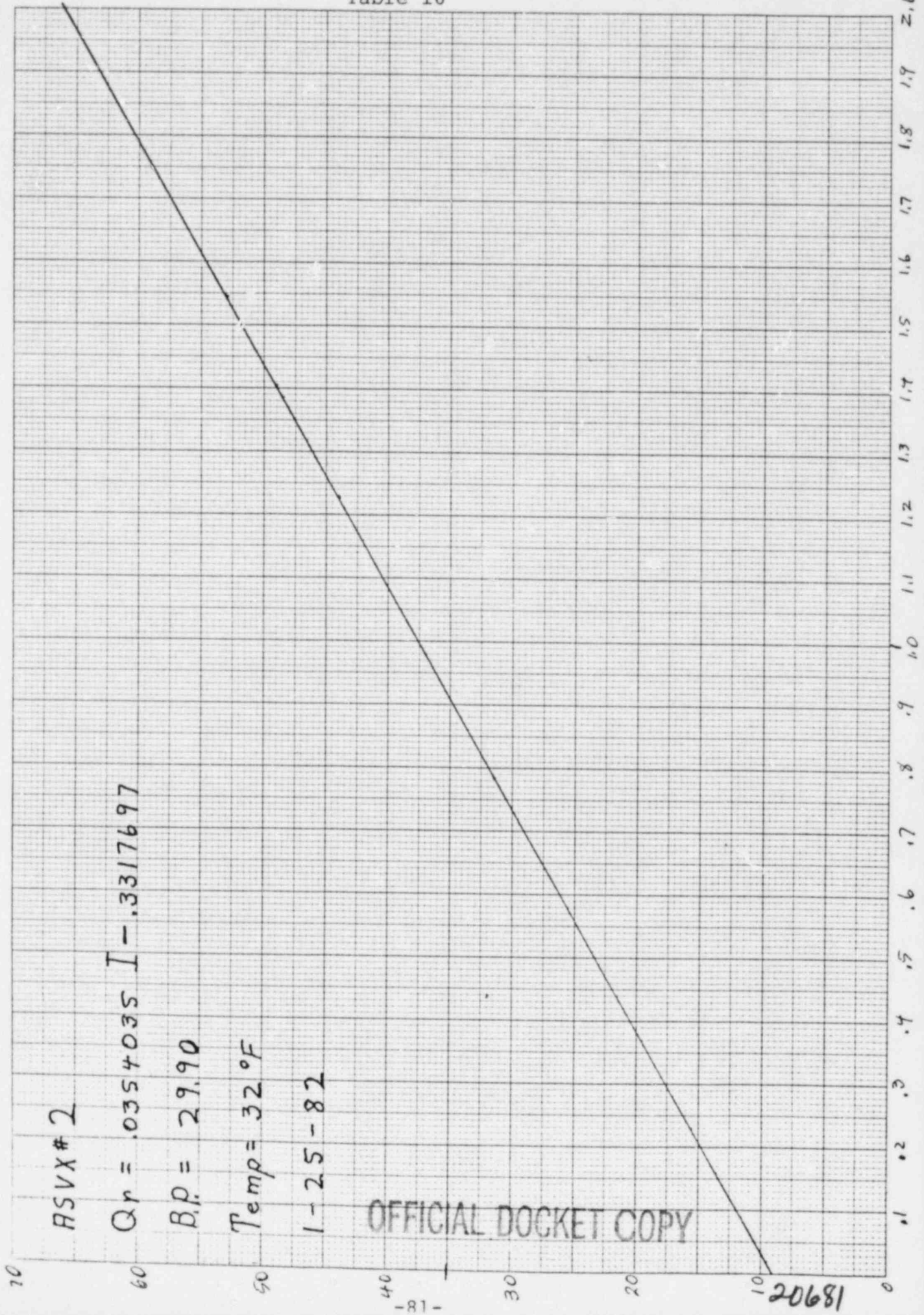
Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		Indicator Reading	$Q_r$ Flow Rate* cmm
		Left Right	Total		
1	18	4.9	9.6	53	1.545
		4.7			
2	13	4.1	8.0	48.5	1.385
		3.9			
3	10	3.3	6.4	44	1.226
		3.1			
4	7	2.15	4.25	37	.978
		2.1			
5	5	1.3	2.55	31.5	.783
		1.25			
6					
7					
Dup-1	18	4.9	9.7	53	1.545
		4.8			
Dup-2	13	4.1	7.9	49	1.403
		3.8			

\*Flow rate from orifice unit calibration chart or equation.

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Table 16



RSVX# 2

Qr = .0354035 I - .3317697

B.P. = 29.90

Temp = 32 °F

I - 2.5 - 82

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10 X 10 TO 1/2 INCH KEUFFEL & ESSER CO. MADE IN U.S.A.

46 1320

°F

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Figure 1

40-8602

Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project

Orifice Unit No. 8050880 Calibrated by: J.L.M.

Sampler No. ASVX #2 Date 3/16/82

Indicator No. \_\_\_\_\_  
(Rotameter/Recorder)  $Q_r = aI \pm b$  \_\_\_\_\_

Correlation coefficient  
of  $r =$  1.0075772  $Q_r =$  .0349488 I - .2827493

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		Indicator Reading	$Q_r$ Flow Rate* cmm
		Left Right	Total		
1	18	5.0	9.7	52.5	1.55
		4.7			
2	13	4.15	8.05	48	1.39
		3.9			
3	10	3.2	6.2	43.5	1.24
		3.0			
4	7	2.15	4.15	36.5	.99
		2.0			
5	5	1.35	2.6	30	.77
		1.25			
6					
7					
Dup-1	18	5.05	9.75	52.5	1.55
		4.7			
Dup-2	13	4.2	8.1	47.5	1.38
		3.9			

\*Flow rate from orifice unit calibration chart or equation.

4

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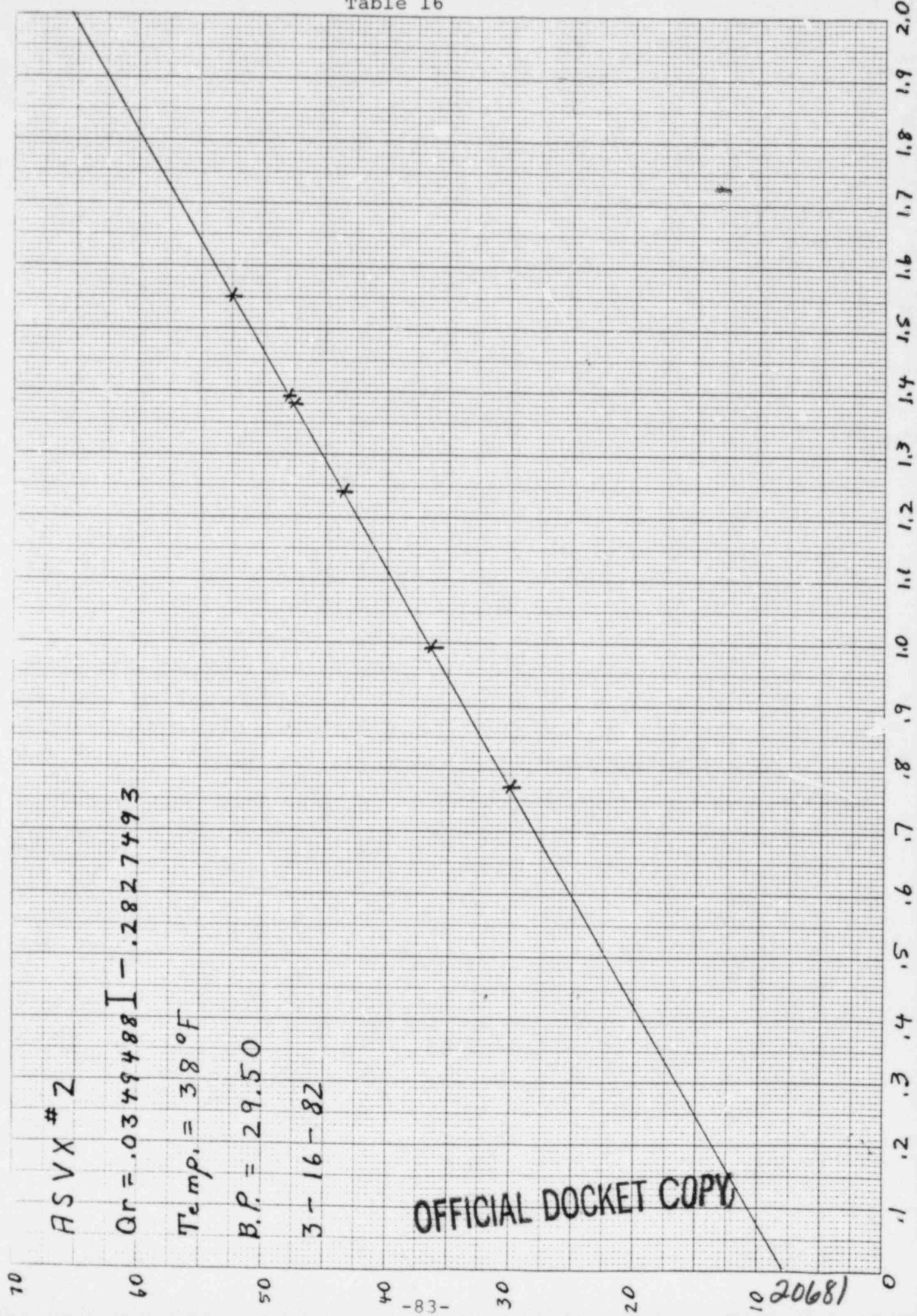
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Table 16

46 1320

10 X 10 TO 1/2 INCH  
KIEFFEL & ESSER CO. MADE IN U.S.A.



ASVX #2

Gr = .0349488 I - .2827493

Temp. = 38 °F

B.P. = 29.50

3-16-82

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Table 16 HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project  
 Orifice Unit No. 8050880 Calibrated by: J.L.M.  
 Sampler No. ASVX #2 Date 4/28/82  
 Indicator No. 34094  $Q_r = aI \pm b$   
 (Rotameter/Recorder)  
 Correlation coefficient of r = 1.0023931  $Q_r = .0306326 I - .1528954$

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		Indicator Reading	$Q_r$ Flow Rate* cmm
		Left	Right		
1	18	5.0		55	1.532
		4.55	9.55		
2	13	4.25		50	1.379
		3.95	8.20		
3	10	3.25		45	1.226
		3.0	6.25		
4	7	2.35		38.5	1.026
		2.1	4.55		
5	5	1.55		32	.827
		1.35	2.90		
6					
7					
Dup-1	18	5.15		56	1.563
		4.8	9.95		
Dup-2	13	4.3		52	1.440
		4.0	8.30		

\*Flow rate from orifice unit calibration chart or equation.

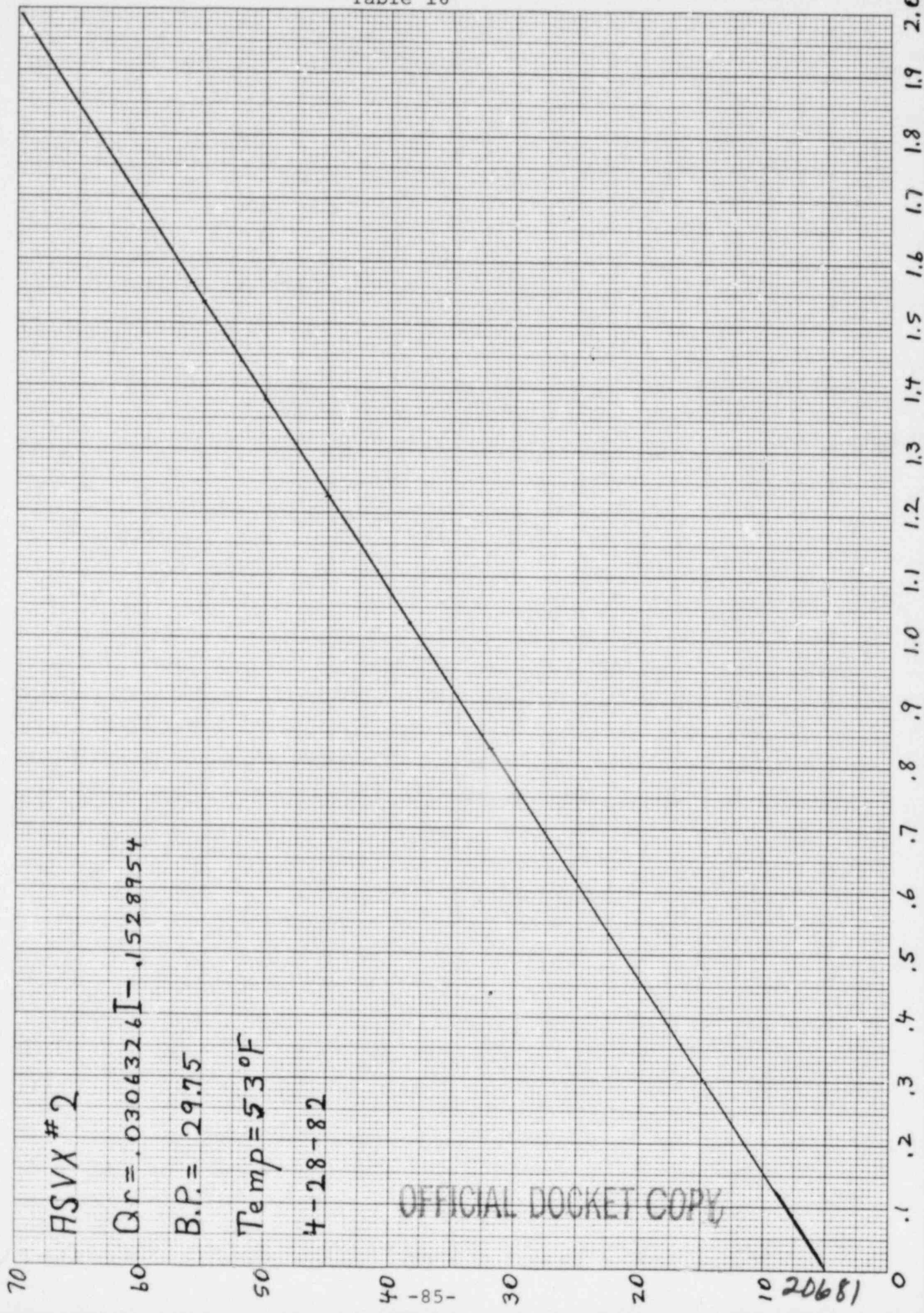
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Table 16

46 1320

K&E 10 X 10 TO 1/8 INCH KEUFFEL & ESSER CO. MADE IN U.S.A.



70 60 50 40 30 20 10 0

0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0

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Figure 1

40-8602

Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project

Orifice Unit No. 8050880 Calibrated by: J.L.M.

Sampler No. ASVX #3 Date 1/20/82

Indicator No. 34139  $Q_r = aI \pm b$

(Rotameter/Recorder)

Correlation coefficient .9990128  $Q_r = .0333685 I - .0384274$

of  $r =$

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		I Indicator Reading	$Q_r$ Flow Rate* cmm
		Left	Right		
1	18	5.0	10.25	49	1.597
		5.25			
2	13	4.15	8.35	43.5	1.413
		4.2			
3	10	3.2	6.45	38	1.230
		3.25			
4	7	2.1	4.3	32	1.029
		2.2			
5	5	1.35	2.7	25	.796
		1.35			
6					
7					
Dup-1	18	4.9	10.0	48	1.563
		5.1			
Dup-2	13	4.0	8.2	43	1.396
		4.2			

\*Flow rate from orifice unit calibration chart or equation.

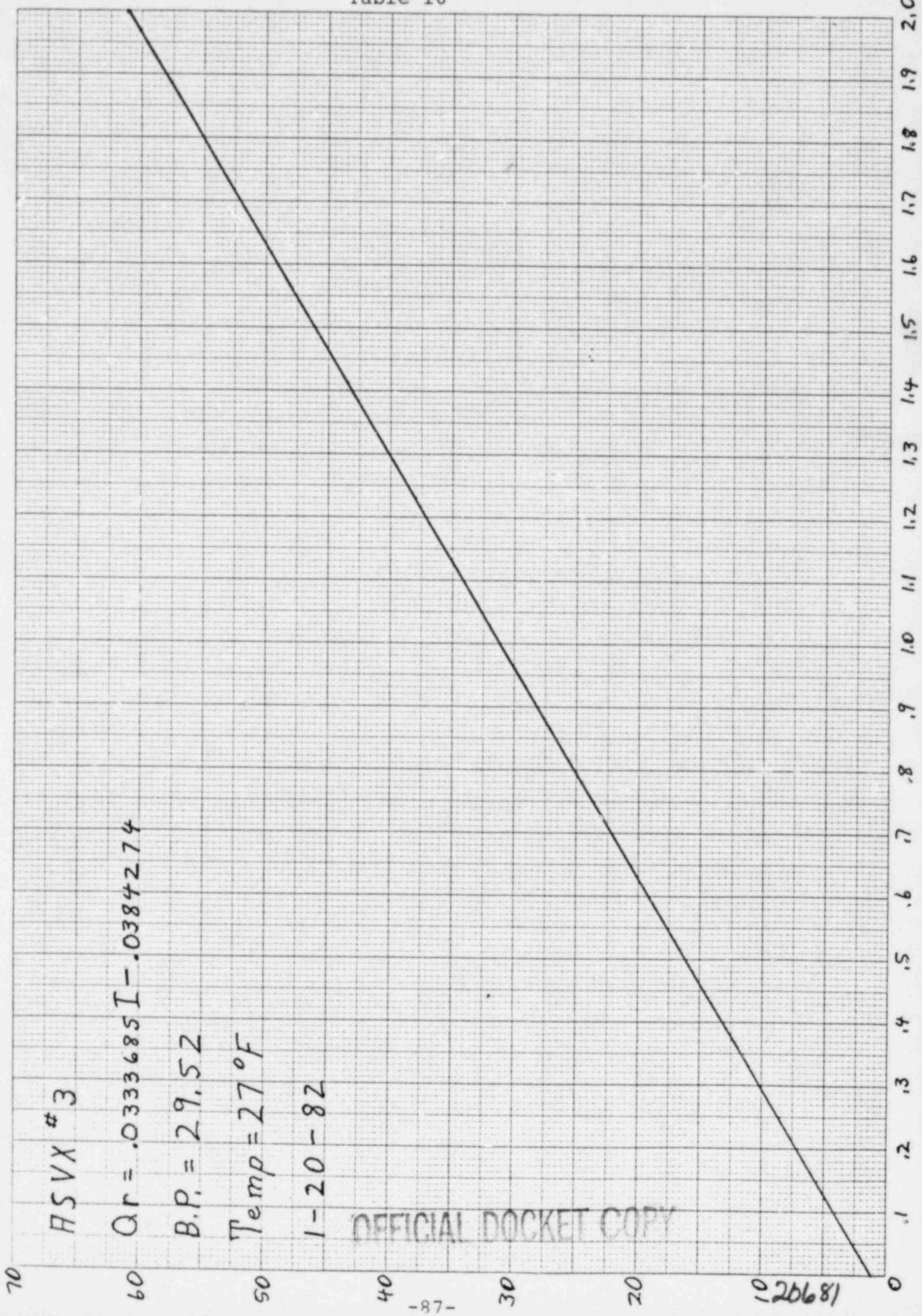
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Table 16

K<sup>o</sup>E 10 X 10 TO 1/2 INCH 7 X 10 INCHES  
KUPFFEL & ESSER CO. MADE IN U.S.A.

46 1320



RSVX #3

QR = .0333685 I - .0384274

B.P. = 29.52

Temp = 27 °F

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Figure 1

40-8602

Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project  
 Orifice Unit No. 8050880 Calibrated by: J.L.M.  
 Sampler No. ASVX #3 Date 4/28/82  
 Indicator No. 34139  $Q_r = aI \pm b$   
 (Rotameter/Recorder)  $Q_r = .317225 I + .0081326$   
 Correlation coefficient  
 of r = .9945192

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		I Indicator Reading	$Q_r$ Flow Rate* cmm
		Left	Right		
1	18	5.0	9.75	49.5	1.578
		4.75			
2	13	4.2	8.2	43	1.372
		4.0			
3	10	3.5	6.8	40	1.277
		3.3			
4	7	2.3	4.45	32	1.023
		2.15			
5	5	1.4	2.8	26	.833
		1.4			
6					
7					
Dup-1	18	5.1	10.4	50	1.594
		5.3			
Dup-2	13	4.25	8.35	44	1.404
		4.1			

\*Flow rate from orifice unit calibration chart or equation.

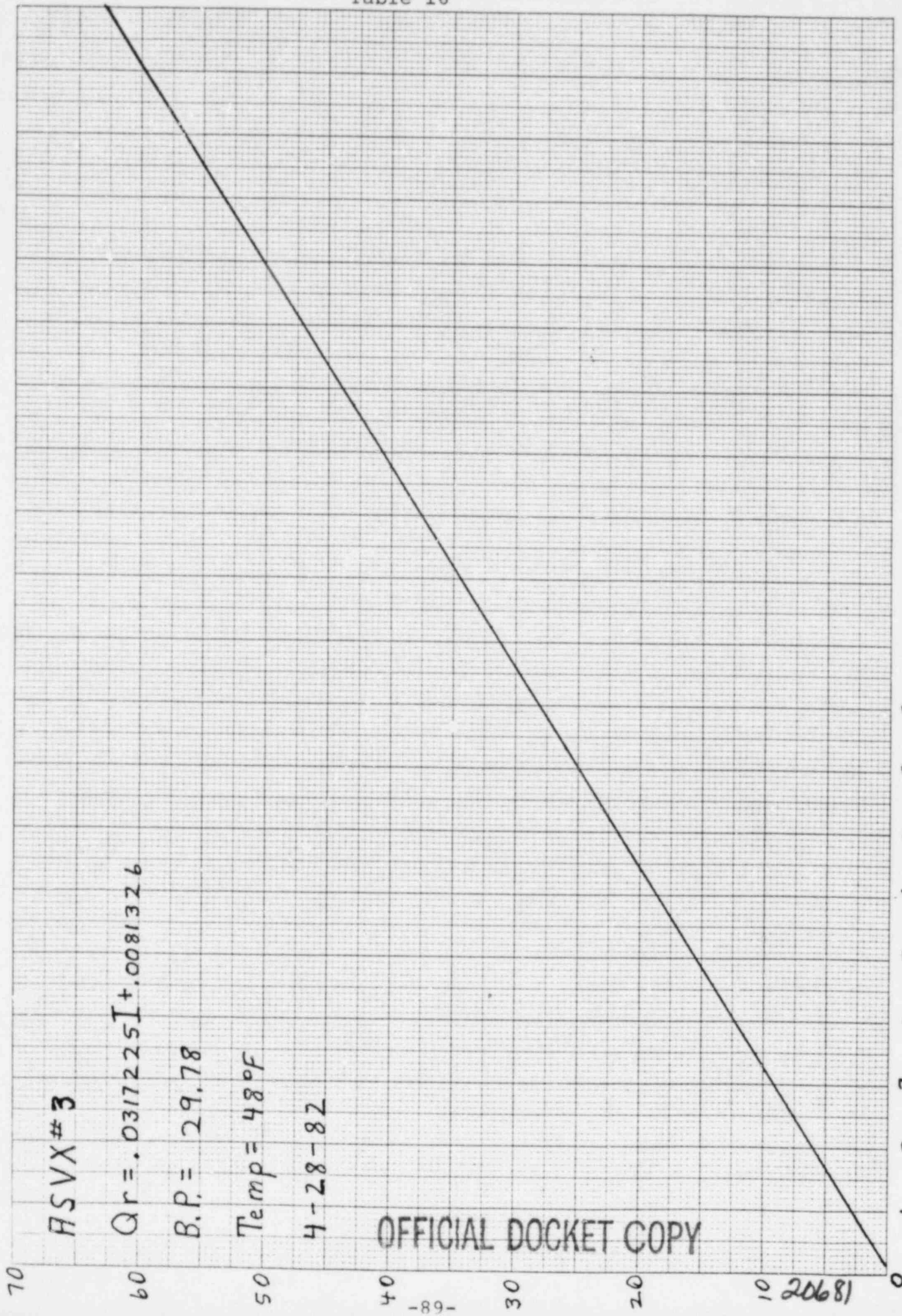
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Table 16

10 X 10 TO 1/2 INCH 7 X 10 INCHES  
KUEFFEL & ESSER CO. MADE IN U.S.A.

46 1320



ASVX #3

Qr = .0317225I ± .0081326

B.P. = 29.78

Temp = 48°F

4-28-82

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.1 .2 .3 .4 .5 .6 .7 .8 .9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0

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Figure 1

40-8602

Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project  
 Orifice Unit No. 8050880 Calibrated by: J.L.M.  
 Sampler No. ASVX #4 Date 1/20/82  
 Indicator No. 34133  $Q_r = aI \pm b$   
 (Rotameter/Recorder)  $Q_r = .0156929 I + .7127504$   
 Correlation coefficient of r = .9039701

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		I Indicator Reading	$Q_r$ Flow Rate* cmm
		Left Right	Total		
1	18	5.3		51	1.513
		5.6			
2	13	4.3		46	1.435
		4.6			
3	10	3.45		42	1.372
		3.75			
4	7	2.15		35	1.262
		2.15			
5	5	1.4		29	1.168
		1.45			
6					
7					
Dup-1	18	5.0		51	1.513
		5.35			
Dup-2	13	4.1		45	1.419
		4.45			

\*Flow rate from orifice unit calibration chart or equation.

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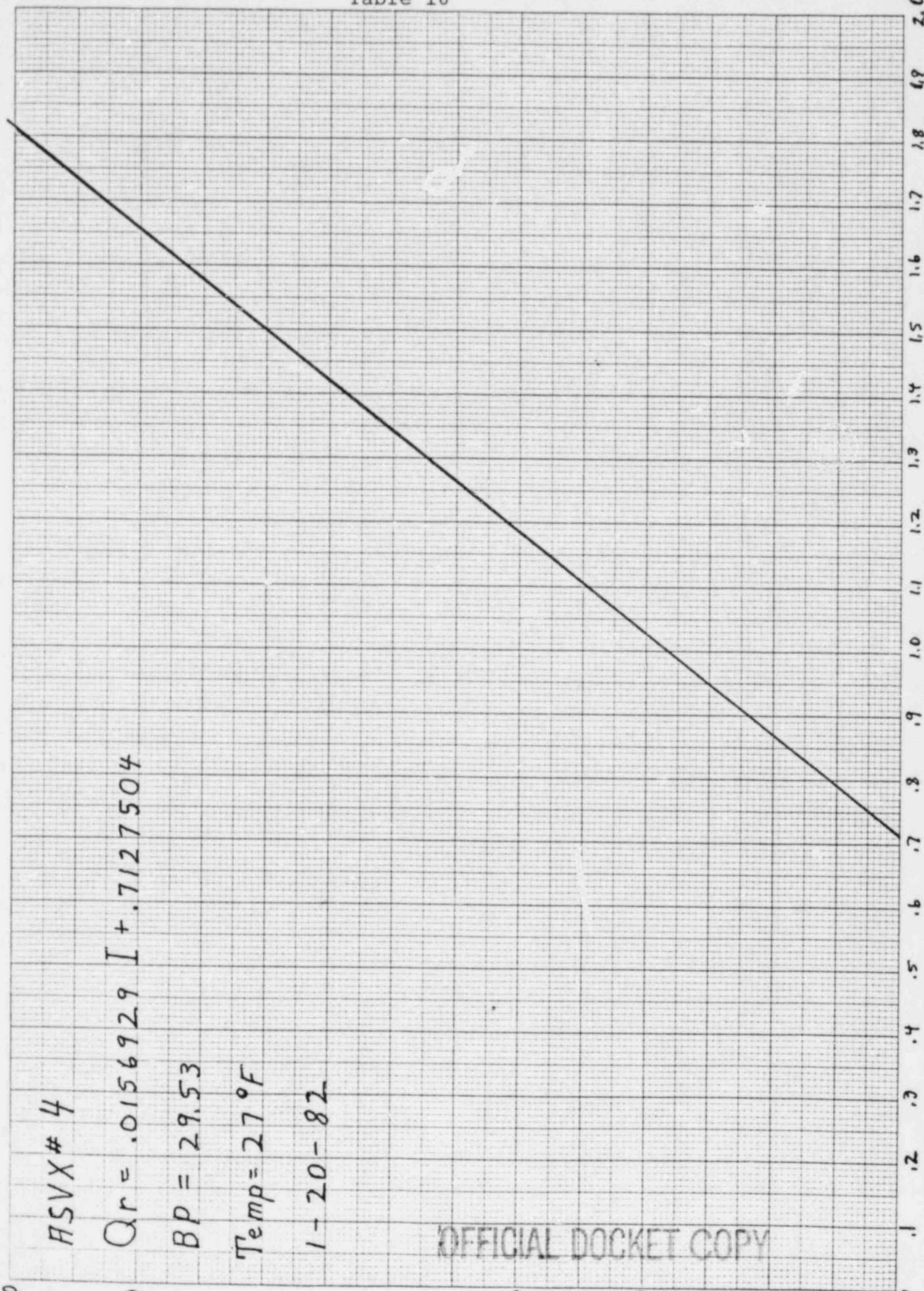
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Table 16

46 1320

K&E 10 X 10 TO 1/2 INCH 7 X 10 INCHES  
KLUFFEL & ESSER CO. MADE IN U.S.A.



ASVX # 4

Qr = .0156929 I + .7127504

BP = 29.53

Temp = 27°F

1-20-82

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40-8602

Figure 1

Table 16 - HI VOL SAMPLER CALIBRATION DATA SHEET

Sampler Location TVA - Morton Ranch Project  
 Orifice Unit No. 8050880 Calibrated by: J.L.M.  
 Sampler No. ASVX #4 Date 4/21/82  
 Indicator No. 34133  $Q_r = aI + b$   
 (Rotameter/Recorder)  $Q_r = .0389812 I - .3729948$   
 Correlation coefficient  
 of r = 1.0076262

Run Number	Voltage or Plate Number	$\Delta H$ Manometer in. Water		I Indicator Reading	$Q_r$ Flow Rate* cmm
		Left	Right		
1	18	5.5	10.5	51	1.615
		5.0			
2	13	4.4	8.55	46	1.420
		4.15			
3	10	3.6	7.0	42	1.264
		3.4			
4	7	2.3	4.5	36	1.030
		2.2			
5	5	1.45	2.75	30	.796
		1.3			
6					
7					
Dup-1	18	5.65	10.65	50.5	1.596
		5.0			
Dup-2	13	4.55	8.85	48.5	1.518
		4.3			

\*Flow rate from orifice unit calibration chart or equation.

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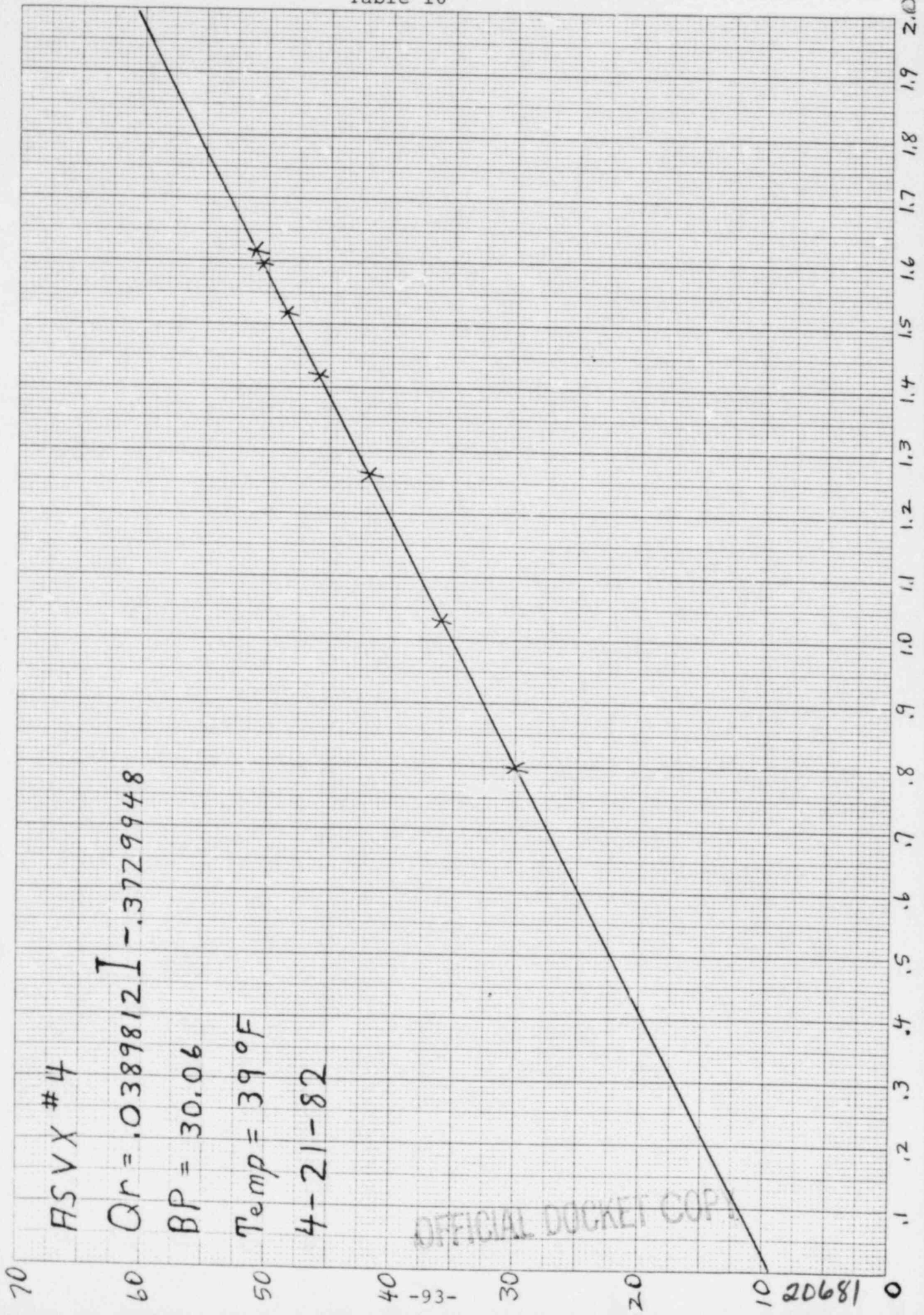
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Table 16

10 X 10 TO 1/2 INCH 7 X 10 INCHES  
REUPPEL & ESSER CO. MADE IN U.S.A.

46 1320



FSVX #4

QR = .0389812 I - .3729948

BP = 30.06

Temp = 39°F

4-21-82

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70 60 50 40 30 20 10 0 20681 0

SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 17 LOW VOLUME AIR SAMPLER CALIBRATION DATA  
1st & 2nd Quarters

<u>Sample Site</u>	<u>Date</u>	<u>Time</u>	<u>T. °F</u>	<u>B.P. in Hg</u>	<u>P<sub>s</sub> in H<sub>2</sub>O</u>	<u>CFM</u>	<u>Actual CFM</u>
ASVX-5	01-26-82	0945	52° F	-----	4.7	---	----
	01-26-82	0950	53° F	-----	4.7	---	----
	01-26-82	0955	55° F	29.45	4.7	7.1	7.1
ASVX-5	01-26-82	1015	57° F	-----	5.9	---	----
	01-26-82	1020	57° F	-----	5.9	---	----
	01-26-82	1025	58° F	29.58	5.9	7.9	7.9
ASVX-5	02-16-82	1125	50° F	-----	3.7	---	----
	02-16-82	1130	50° F	-----	3.7	---	----
	02-16-82	1135	50° F	29.48	3.7	7.6	7.4
ASVX-5	02-22-82	1035	56° F	-----	3.8	---	----
	02-22-82	1040	56° F	-----	3.7	---	----
	02-22-82	1045	56° F	29.62	3.5	7.4	7.1
ASVX-5	03-22-82	1400	37° F	-----	4.7	---	----
	03-22-82	1405	37° F	-----	4.7	---	----
	03-22-82	1410	37° F	29.70	4.7	6.9	6.8
ASVX-5	03-22-82	1450	40° F	-----	5.7	---	----
	03-22-82	1455	40° F	-----	5.7	---	----
	03-22-82	1500	40° F	29.66	5.7	7.6	7.5
ASVX-5	05-14-82	1205	41° F	-----	4.1	---	----
	05-14-82	1210	41° F	-----	4.1	---	----
	05-14-82	1215	41° F	24.78	4.1	6.5	6.4
ASVX-5	05-14-82	1255	41° F	-----	5.2	---	----
	05-14-82	1300	41° F	-----	5.2	---	----
	05-14-82	1305	41° F	24.77	5.2	7.2	7.1

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 17 LOW VOLUME AIR SAMPLER CALIBRATION DATA  
1st & 2nd Quarters

<u>Sample Site</u>	<u>Date</u>	<u>Time</u>	<u>T. °F</u>	<u>B.P. in Hg</u>	<u>P<sub>S</sub> in H<sub>2</sub>O</u>	<u>CFM</u>	<u>Actual CFM</u>
ASVX-5	06-22-82	1155	72° F	-----	4.3	---	----
	06-22-82	1200	72° F	-----	4.3	---	----
	06-22-82	1205	73° F	29.70	4.4	6.7	6.8
ASVX-5	06-22-82	1250	74° F	-----	4.6	---	----
	06-22-82	1255	74° F	-----	4.6	---	----
	06-22-82	1300	75° F	29.69	4.6	6.9	7.0
ASVX-5	06-30-82	1115	67° F	-----	6.0	---	----
	06-30-82	1120	67° F	-----	5.65	---	----
	06-30-82	1125	67° F	29.66	5.65	7.5	7.6
ASVX-6	01-05-82	1325	22° F	29.26	3.4	---	----
	01-05-82	1330	22° F	29.26	3.4	---	----
	01-05-82	1335	22° F	29.26	3.4	6.1	6.0
ASVX-6	02-12-82	0930	36° F	24.97	2.2	---	----
	02-12-82	0935	36° F	24.97	2.2	---	----
	02-12-82	0940	36° F	24.98	2.2	6.0	5.7
ASVX-6	03-22-82	1000	33° F	29.82	3.60	---	----
	03-22-82	1005	33° F	29.82	3.60	---	----
	03-22-82	1010	34° F	29.82	3.60	6.1	6.0
ASVX-6	05-05-82	1005	39° F	29.84	3.8	---	----
	05-05-82	1010	39° F	29.84	3.8	---	----
	05-05-82	1015	40° F	29.84	3.8	6.3	6.2
ASVX-6	06-21-82	1200	80° F	-----	6.7	---	----
	06-21-82	1205	80° F	-----	6.0	---	----
	06-21-82	1210	80° F	29.71	5.8	7.6	7.8

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SILVER KING MINES, INC.  
MORTON RANCH PROJECT

TABLE 17 LOW VOLUME AIR SAMPLER CALIBRATION DATA  
1st & 2nd Quarters

<u>Sample Site</u>	<u>Date</u>	<u>Time</u>	<u>T. °F</u>	<u>B.P. in Hg</u>	<u>P<sub>s</sub> in H<sub>2</sub>O</u>	<u>CFM</u>	<u>Actual CFM</u>
ASVX-6	06-28-82	1050	66° F	-----	3.15	---	----
	06-28-82	1055	67° F	-----	3.15	---	----
	06-28-82	1100	67° F	29.64	3.15	5.8	5.9

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(9) and (10) are corrected to 760 mm of Hg and 25°C

CALIBRATION WORK SHEET

(1)	(2)	(3)	(4)	(5)	X (6)	(7)	(8)	X (9)	(10)
Test-Point No.	Elapsed Time - Δt Min.	Initial Volume V <sub>in</sub> M <sup>3</sup>	Meter Static Pressure - P <sub>S</sub> "Hg	True Volume V <sub>T</sub> M <sup>3</sup>	Calibrator Static Press. "H <sub>2</sub> O	Flow Rate Q M <sup>3</sup> /min.	Flow Rate Q ft <sup>3</sup> /min.	Corrected Flow Rate Q ft <sup>3</sup> /min.	Corrected Flow Rate Q M <sup>3</sup> /min.
1	7.314	1	0.2	0.993	2.0	0.136	4.8	4.9	0.14
2	4.971	1	0.4	0.987	5.0	0.199	7.0	7.1	0.20
3	3.683	1	0.7	0.977	9.0	0.265	9.4	9.6	0.27
4	3.051	1	0.9	0.971	13.0	0.318	11.2	11.5	0.32
5	2.592	1	1.3	0.957	17.0	0.369	13.0	13.3	0.38
6									
7									

Calibration performed by:

(11) P<sub>B</sub>: 30.52 "Hg      Roots Meter No.: 7509364      L. Sauer  
 (12) T: 67 °F      Calibrator: Low-Flow-Spec      Date of Calibration: 16 Feb 82  
 (13) RH: 37 %      Serial No.: 002      Date placed in service: \_\_\_\_\_  
 (To be noted by user)

EQUATIONS

$$V_T = V_{in} \frac{P_B \cdot P_S}{P_B}$$

$$= (3) \frac{(11) - (4)}{(11)}$$

$$Q = \frac{V_T}{\Delta t} = \frac{(5)}{(2)}$$

$$M^3 \times 35.31 = Ft^3$$

When using this instrument to calibrate a high volume sampler at conditions other than those at which the calibration took place, or was corrected to, (11) (12), the following relation should be applied.

$$Q_T = Q \left[ \frac{T_T \cdot P_B}{T \cdot P_T} \right]^{1/2}$$

NOTE: IN THIS EQUATION USE ABSOLUTE TEMPERATURE (RANKINE)

where:

Q<sub>T</sub> = flow at new conditions T<sub>T</sub> and P<sub>T</sub>.

For additional information consult:

1. The Federal Register, Vol. 36, No. 84, pp. 8191 - 8194, April 30, 1971.
2. Guidelines for Development of a Quality Assurance Program - High Volume Method. EPA - 600/4-77-027a

- Notes:
1. Calibrators should be recalibrated after one year of field use.
  2. Copies of this calibration are not kept on file.

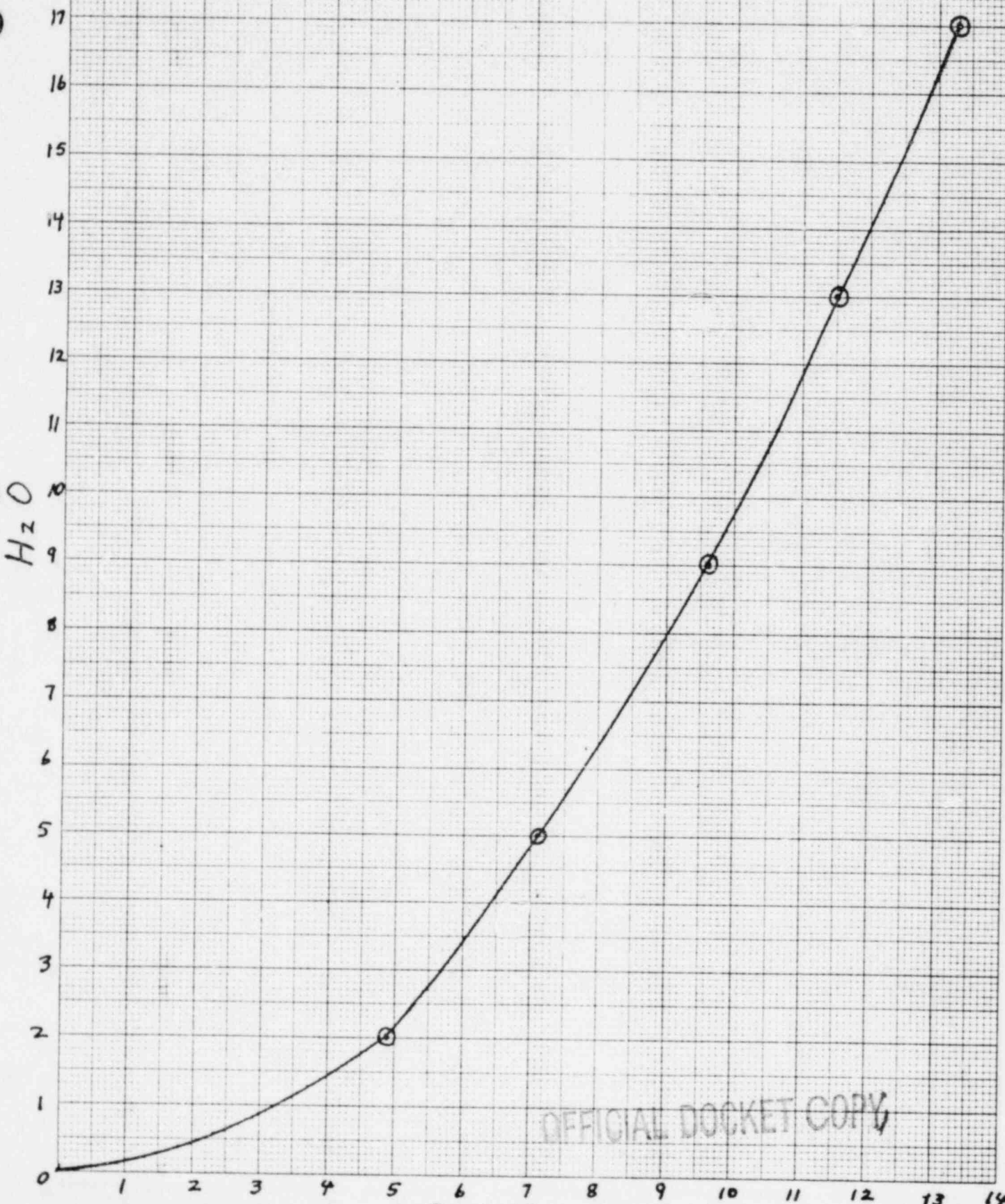
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D4008602121E  
L-1 Calibration Curve - Serial # 002 40-8602

Calibrated 2-16-82

Temp. 67°F - 292.59°K

Barometric Pressure - 30.52



46 1320

K-Σ 1/8" TO 1" INCH T.A. TO INCHES  
NEUFEL & ESSER CO. J.A.S. IN U.S.A.

H<sub>2</sub>O

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IX. SUPPLEMENTAL INFORMATION (continued)B. Lower Limit of Detection

The lower limit of detection is defined as the smallest concentration of radioactive material sampled that has a 95% probability of being detected.

The lower limit of detection for individual analyses are calculated based on the following equation:

$$LLD = \frac{4.66 s_b}{3.7 \times 10^4 \text{ EVY exp } (-\lambda \Delta t)}$$

Where

- LLD is the lower limit of detection (microcuries per milliliter, microcuries per gram);
- $s_b$  is the standard deviation of the instrument background counting rate (counts per second)
- $3.7 \times 10^4$  is the number of disintegrations per second per microcurie;
- E is the counting efficiency (counts per disintegration)
- V is the sample volume (milliliters, grams);
- Y is the fractional radiochemical yield (when applicable);
- $\lambda$  is the radioactive decay constant for the particular radionuclide; and
- $\Delta t$  is the elapsed time between sample collection and counting.

The actual net measured values (including negative values) and their associated errors are reported. Values lower than the lower limit of detection are reported in the following manner:

Analysis Result .....	0.20 ± 1.5
Lower Limit of Detection .....	0.27
Reported Results .....	0.20 ± 1.5
Analysis Result .....	-0.35 ± 1.5
Lower Limit of Detection .....	0.27
Reported Result .....	-0.35 ± 1.5

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IX. SUPPLEMENTAL INFORMATION (continued)C. Additional Information

Refer to the Morton Ranch Source Material License No. SUA-1356 Amendment No. 4, License Condition No. 44-A & B, submitted to the U. S. Nuclear Regulatory Commission on June 6, 1981 for the following information:

1. Description of Sampling Equipment
2. Operating Procedures
3. Quality Assurance Program
4. Analytical Procedures

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Table 5.5-0 Preoperational Radiological Environmental Monitoring Program

Type of Sample	Number	Sample Collection			Sample Measurement	
		Location	Type	Frequency	Frequency	Type of Measurement
AIR Particulates	4 Hi Vol	At or near the site boundaries in different sectors that will have the highest predicted airborne radionuclide concentrations during milling operations.	Continuous for 24 hours	One every sixth day	Quarterly composites of weekly samples	Particulates (Total Suspended), U <sup>nat</sup> , Ra-226, Th-230, Pb-210
	1 Low Vol	At a control or background location remote from site, 10-20 KM SE or SSE from the tailings deposition point.	Continuous <sup>a</sup>	Weekly filter change or more frequently as required by dust	Quarterly composites of weekly samples	U <sup>nat</sup> , Ra-226, Th-230, Pb-210
	1 Low Vol	At or close to the nearest residence(s) or occupied offsite structure(s) (if within 10 km of site).	Continuous <sup>a</sup>	Weekly filter change or more frequently as required by dust loading	Quarterly composites of weekly samples	U <sup>nat</sup> , Ra-226, Th-230, Pb-210
Radon Gas	Six	Same locations as 4 Hi Vol and two Low Vol air particulate sites	Continuous for 24 hours	One every sixth	Each sample	Rn-222
WATER Groundwater	One <sup>c</sup>	Applicant's site drinking water	Grab	Quarterly	Quarterly	Suspended and Dissolved U <sup>nat</sup> , Ra-226, Th-230, Chemicals Suspended and Dissolved Pb-210, Po-210
				Semi-annually	Semi-annually	

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Table 5.5-0 Preoperational Radiological Environmental Monitoring Program - Continued

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Sample Collection					Sample Measurement	
Type of Sample	Number	Location	Type	Frequency	Frequency	Type of Measurement
FOOD	2 Cows 1 Sheep	Crops and livestock, raised within 5 km of mill site	Grab	Time of harvest or slaughter	Once	$U_{nat}$ , Ra-226 and Th-230, Pb-210 and Po-210
SITE SURVEY						
Gamma Dose-rate	81	150-m intervals to a distance of 1500 m in each of eight directions from center of milling area or at a point equidistant from milling area <sup>a</sup> and tailings disposal area	Gamma dose-rate	Once prior to site construction	Once	Pressurized ionization chamber (PIC) or equivalent
	Ten	150-m intervals in both horizontal and vertical traverses across milling area	Gamma dose-rate	Once following excavation, leveling, or contouring of milling area	Once	PIC or equivalent
	Six	At same locations as used for collection of particulate	Gamma dose-rate	Quarterly	Quarterly	PIC or equivalent
Surface Soil <sup>P</sup>	41	300-m intervals to a distance of 1500 m in each of eight directions from center of milling area or at a point equidistant from milling area and tailings disposal area.	Grab	Once prior to site construction	Once	All samples for Ra-226, 10% of samples $U_{nat}$ , Th-230, & Pb-210
	7	300-m intervals in both a horizontal and vertical traverse across the milling area	Grab	Once following excavation, leveling or contouring of milling area	Once	Ra-226 (all samples) $U_{nat}$ , Th-230, and Pb-210 (one sample)
	Six	At same locations as used for collection of air particulate samples	Grab	Once prior to site construction	Once	$U_{nat}$ , Ra-226, Th-230, and Pb-210

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Table 5.5-0 Preoperational Radiological Environmental Monitoring Program - Continued

Type of Sample	Number	Sample Collection			Sample Measurement	
		Location	Type	Frequency	Frequency	Type of Measurement
Surface Water <sup>d</sup>	Eleven <sup>c</sup>	Wells located around future solution pond and tailings. Three wells hydrologically up-graded of all disturbed areas, four wells downgradient of tailings disposal site and up-gradient of tailings effluent pond, three wells downgradient of tailings effluent pond, one well in Box Creek alluvium	Grab	Quarterly	Quarterly	Dissolved U <sup>nat</sup> , Ra-226, Th-230, Chemicals <sup>j</sup>
				Semi-annually	Semi-annually	Dissolved Pb-210, Po-210
	Three <sup>c</sup>	Wells within 2 km of tailings disposal area which are or could be used for potable water supplies, watering of livestock or crop irrigation	Grab	Quarterly	Quarterly	Suspended and Dissolved U <sup>nat</sup> , Ra-226, Th-230, Chemicals <sup>j</sup>
				Semi-annually	Semi-annually	Suspended and Dissolved Pb-210 and Po-210
	Three	Drainage system downstream of mill and tailings area	Grab	Quarterly following precipitation event	Quarterly following precipitation event	Suspended and Dissolved U <sup>nat</sup> , Ra-226, Th-230, Pb-210, Po-210, Suspended Solids
	Two	Drainage system upstream of mill and tailings area	Grab	Quarterly following precipitation event	Quarterly following precipitation event	Same as above
One	Mill water impoundment	Grab	Quarterly	Quarterly	Suspended and dissolved U <sup>nat</sup> , Ra-226, Th-230	
VEGETATION (Forage)	Four	Grazing areas near the site same as Hi Vol air particulates sites	Grab	Semi-annually	Semi-annually	Suspended and dissolved Pb-210 and Po-210
				Three times during grazing season	Three times	U <sup>nat</sup> , Ra-226, Th-230, Pb-210, Po-210

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Table 5.5-0 Preoperational Radiological Environmental Monitoring Program

Type of Sample	Number	Sample Collection			Sample Measurement	
		Location	Type	Frequency	Frequency	Type of Measurement
AIR Particulates	4 Hi Vol	At or near the site boundaries in different sectors that will have the highest predicted airborne radionuclide concentrations during milling operations.	Continuous for 24 hours	One every sixth day	Quarterly composites of weekly samples	Particulates (Total Suspended), U <sup>nat</sup> , Ra-226, Th-230, Pb-210
	1 Low Vol	At a continu. or background location remote from site, 10-20 KM SE or SSE from the tailings deposition point.	Continuous <sup>a</sup>	Weekly filter change or more frequently as required by dust	Quarterly composites of weekly samples	U <sup>nat</sup> , Ra-226, Th-230, Pb-210
	1 Low Vol	At or close to the nearest residence(s) or occupied offsite structure(s) (if within 10 km of site).	Continuous <sup>a</sup>	Weekly filter change or more frequently as required by dust loading	Quarterly composites of weekly samples	U <sup>nat</sup> , Ra-226, Th-230, Pb-210
Radon Gas	Six	Same locations as 4 Hi Vol and two Low Vol air particulate sites	Continuous for 24 hours	One every sixth	Each sample	Rn-222
WATER Groundwater	One <sup>c</sup>	Applicant's site drinking water	Grab	Quarterly	Quarterly	Suspended and Dissolved U <sup>nat</sup> , Ra-226, Th-230, Chemicals <sup>d</sup>
				Semi-annually	Semi-annually	Suspended and Dissolved Pb-210, Po-210

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