DPSP-83-1-4 (Excerpts)

TECHNICAL REPORT FOR APRIL 1983 (EXCERPTS)

by

Dupont SRP

This is a Technical Report

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HEALTH PROTECTION DEPARTMENT

RADIATION SURVEY

Reactor Areas

P AREA

Whole body radiation exposure rates to 10 R/hr and extremity rates to 20 R/hr were encountered during removal of a nose plug for inspection of the reactor tank exterior wall during a scheduled outage. A radiation exposure rate of 50 R/hr was measured flush with the biological shield opening. Transferable contamination to 2.0×10^4 c/m beta-gamma/0.1 m^2 was controlled by the use of a containment hut. Special TLD dosimeters were worn by personnel to audit exposure to whole body, head, hands, and arms. An estimated radiation dose totaling 2.2 rems was accumulated.

Radiation exposure rates to 100 mR/hr and airborne tritium concentrations to 2.0×10^{-5} µCi/cc were measured during regasketing of heat exchanger inhibitor heads. Personnel involved in the work received an estimated exposure of 2.3 rems.

The maximum tritium assimilation during the report period was 7.3 µCi/l of body fluids. The assimilation occurred when a distillation area sightglass leaked and a Reactor employee came in contact with moderator. Airborne tritium concentrations to 1.0×10^{-4} µCi/cc were present. Air-supplied plastic suits were worn to repair the sightglass.

L AREA

Process area radiation exposure rates for renovation work ranged from 1 to 5 mR/hr. An estimated 10,000 gal of virgin moderator was added to the reactor system in preparation for leak checking and flushing. Airborne tritium concentrations averaged less than 1.0×10^{-5} µCi/cc and no unusual radiological control problems were encountered.

K AREA

The reactor was shutdown for replacement of the top and bottom biological shield pump. Radiation exposure rates averaged 45 mR/hr, and no significant airborne tritium radioactivity was encountered. A total radiation dose of 0.6 rem was accumulated by nine personnel.

C AREA

No significant radiological problems occurred during the report period.

M AREA

No unusual radiation or contamination problem were encountered during the report period.

Waste Management

BUILDING 241-F, H-AREA GENERAL

The new shielded crane was used for nine jobs involving removal of cell covers from diversion boxes and pump pits. Exposure dose rates in the cab did not exceed 1 mR/hr. Radiation intensities over the open cell ranged to 1 R/hr. Seventy personnel received an estimated total dose of 1.6 rems.

Radiation exposure dose rates over open risers to remove or install various jet assemblies were reduced from a maximum of 50 R/hr to 500 mR/hr by extensive lead shielding. The total estimated dose for 67 personnel was 3.5 rems.

Occupational Health

L AREA

Airborne concentrations of xylene to 400 ppm (TLV = 100 ppm) were measured during painting of floors and walls in the process areas with "Amercoat." Personnel applying the paint wore appropriate respirators.

BUILDING 241-TANK 48

Extensive industrial hygiene monitoring continued during the salt decontamination demonstration program. Analyses of 110 air samples indicated benzene concentrations ranging to 15 ppm in the tank purge exhaust and < 1 ppm in personnel breathing zones (TLV = 10 ppm). No additional occupational health controls were required beyond those established for the initial startup of the demonstration program.

OCCUPATIONAL HEALTH ENGINEERING

Radiological Engineering

DEFENSE WASTE PROCESSING FACILITY (DWPF)

Unshielded glass waste canister radiation levels vs. distance were determined for four cases reflecting variable glass density and gamma source term.

HIGH LEVEL WASTE SUPERNATE PROCESSING

Health Protection considerations were reviewed for the revised Z-Area layout and mode of operation.

INDUSTRIAL HYGIENE MONITORING AND LABORATORY ANALYSES

Analysis	Area Measurements or Samples[a]	IH Lab Analyses	Offplant Lab Analyses
Ammonia	5	--	--
Asbestos			
-Fiber count	15	15	--
-ID	4	--	4
Chloride[d]	--	30	--
Chlorine	40	--	--
Explosive mixtures	481	--	--
Formic acid	8	--	7
Free silica[e]	7	--	7
Gravimetric[b]	61	27	3
Hydrazine	4	--	5
Lead	--	--	3
Mercury	8	--	--
Microwaves	18	--	--
Nitrates[d]	--	15	--
Nitric acid	5	--	--
Organic vapors			--
-Benzene	--	--	14
-Isopronyl alcohol	2	--	12
-Methylene chloride	1	--	--
-Methyl isobutyl ketone	2	--	2
-Mineral spirits	7	--	8
-Toluene	2	--	2
-Toluene diisocyanate	2	--	--
-Total hydrocarbons	21	--	--
-Xylene	35	--	--
Oxygen deficiency	411	--	--
Sound level measurements[c]	10	--	--
Ventilation	129	--	--
Totals	1,278	87	67

[a]Represents 636 surveys.
[b]Represents 20 breathing air surveys(three samples/survey)and one oil mist survey.
[c]Does not include department annual surveys.
[d]Analysis performed to validate new IH procedures.
[e]Two samples split for quality control check.

SRP's Environmental Monitoring group. In general, the Georgia data agreed with SRP data even though the sample dates and collection frequencies were different in many cases. This indicates good sample collection and analyses techniques by both groups.

The GDNR environmental surveillance program near SRP consists of the following:

Type Sample	No. of Sampling Locations	Sampling Frequency
TLD's	25	Quarterly
Surface water	7	"
Groundwater	10	"
Soil	8	"
Grass	8	"
Air	3	"
Milk	7	Monthly
Fish, wildlife, animals, fruits, vegetables, and river sediment	(Analyzed when available)	

A direct comparison of GDNR data with SRP data was difficult in many cases because the exact location of the GDNR sample site was not specified. GDNR used general location categories rather than specific sample locations.

TLD data from Georgia's "near site background" and "indicator" locations were compared with SRP data from 25-mile radius locations (table HP-8). "Near site background" locations are stations within 30 miles of the SRP that are not expected to be affected by SRP operations, whereas "indicator" locations are around the SRP plant perimeter and might be affected by plant operations. GDNR TLD measurements were approximately 60% lower than SRP's TLD measurements. The exact reason for this discrepancy is not known but may be attributed to the location of the dosimeters or the type of dosimeter. This specific information was not given in the GDNR report. GDNR indicated that they plan to correct the reported TLD measurements.

GDNR data for tritium in surface water in Port Wentworth drinking water and in milk samples from dairies near SRP were also compared with SRP results (tables HP-9 through HP-11). These data showed good agreement with each other. In many cases, the Georgia data were derived from samples supplied to GDNR by SRP.

A special survey of the Savannah River was conducted by GDNR on February 23, 1981. Water samples were collected at nine locations along the river between the New Savannah Bluff Lock Dam and Highway 301 (figure HP-2). These samples were analyzed for tritium. SRP's tritium results for comparable river samples were in good agreement with the Georgia data (table HP-12).

The source of the mercury is being investigated by Waste Management Technology. Samples from the contributing streams to the seepage basin are being analyzed for mercury to determine the source.

RADIOACTIVE RELEASES

No annual guides were exceeded during February. One annual guide was exceeded during the same period in 1982.

Also, during February, seven prorated annual guides were exceeded. Table HP-21 contains graphic summaries of the releases that have exceeded prorated annual guides. The reasons for the guides being exceeded are given below each graph.

SAVANNAH RIVER

Transport of tritium in the river is shown in table HP-17.

MERCURY RELEASES

Mercury releases to separations areas seepage basins are summarized in table HP-18.

FECAL COLIFORM BACTERIA

Fecal coliform bacteria data are summarized in table HP-19.

RADIOACTIVE RELEASE TABLES

Detailed radioactive release data are contained in the following tables:

HP-22 Reactor Areas Liquid
HP-23 Reactor Areas Atmospheric
HP-24 Separations Areas Seepage Basins
HP-25 Separations Areas Liquid to Streams
HP-26 Separations Areas Atmospheric
HP-27 Raw Materials Area Atmospheric and Liquid
HP-28 D-Area Atmospheric and Liquid
HP-29 Technical Area Atmospheric and Liquid

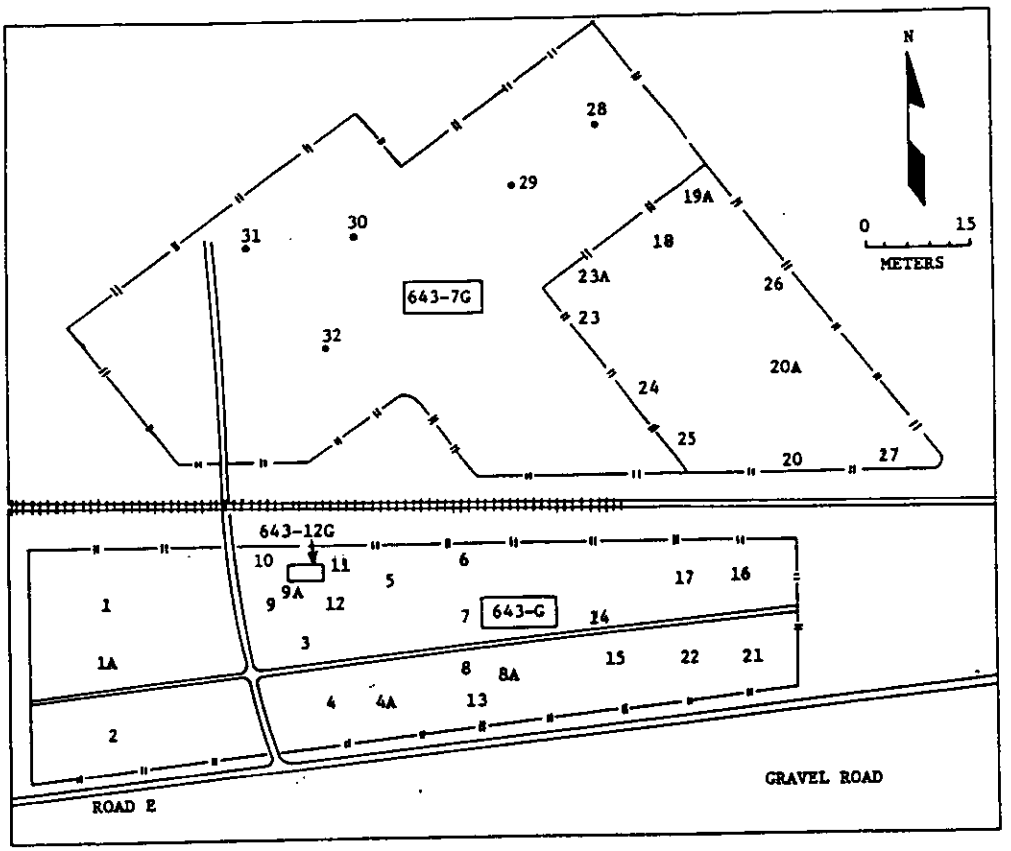


FIGURE HP-1. VEGETATION SAMPLING LOCATIONS
IN SOLID WASTE STORAGE FACILITY

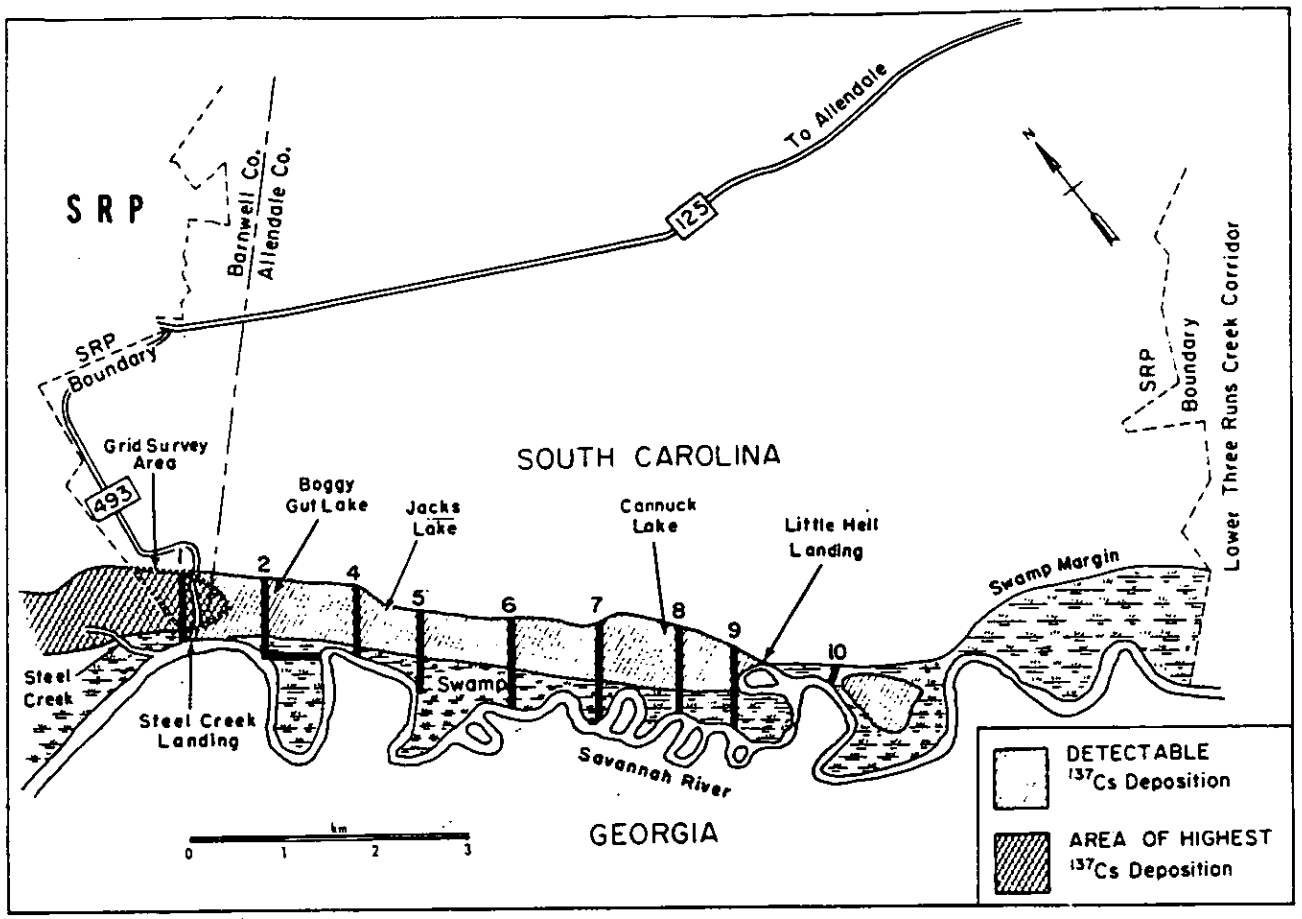


FIGURE HP-3. RADIOACTIVITY DEPOSITED IN THE SAVANNAH RIVER SWAMP

TABLE HP-1

DISTRIBUTION OF EXPOSURES AND ASSIMILATIONS
(THROUGH MARCH)

	Cumulative Exposure rems		Cumulative Confirmed Assimilations	
	1982	1983	1982	1983
Reactor	58.0	31.1	0	0
100-L	22.0	18.2	2	0
Waste Management	16.1	14.2	0	0
Separations	190.0	140.0	5	0
Raw Materials	18.5	20.4	0	0
Rest of Plant	17.2	7.4	0	0
SRP Total	321.8	231.3	7	0
SRL	23.0	10.9	0	0
Total	344.8	242.2	7	0

TABLE HP-2
PERSONNEL MONITORING

	Personnel Exposure (rems) 1982		1983	
	SRP	SRL	SRP	SRL
Monthly Badged Personnel-Cycle 3	119.2	9.9	89.7	4.4
Total Exposure Year-to-Date	321.8	23.0	231.3	10.9
Whole Body Exposures >750 mrems	11	0	4	0

Highest Whole body exposure (mrem)

Dept.	Area	Dose equivalent
WM	200-F	995

TABLE HP-3
BIOASSAY SUMMARY
(MARCH)

	Positive Samples	Maximum Concentration	Confirmed Uptakes Month	Confirmed Uptakes YTD	Number of Samples Received Month	Number of Samples Received YTD
Tritium	934	18.0 µCi HTO/ℓ	0	0	6,344	17,644
Uranium	19	30 ug/1.5ℓ	0	0	180	378
Plutonium	35	301 d/m/1.5ℓ	0	0	549	1,365
Enriched U.	115	114 d/m/1.5ℓ	0	0	528	989
Fission & Activation Prod.	0	--	0	0	82	917
Americium-Curium	0	--	0	0	65	113
Neptunium	0	--	0	0	20	22
Lead	0	--	0	0	2	6
Mercury	0	--	0	0	0	10
1983 Totals			0	0	7,770	21,444
1982 Totals					6,622	19,915

TABLE HP-7

Radioactivity in Burial Ground Vegetation, pCi/g

Sample Location (Figure EM-5)	Alpha	K-40	Cs-137	Sample Location (Figure EM-5)	Alpha	K-40	Cs-137
1	0.20 ± 0.18	10 ± 5.7	0.01 ± 0.54	16	0.12 ± .10	13 ± 5.5	0.28 ± 0.51
1A	0.06 ± .13	9 ± 5.4	0 ± 0.52	17	0.06 ± .13	10 ± 5.6	1.1 ± 0.56
2	0.42 ± .25	7 ± 4.9	0.22 ± 0.48	18	0.03 ± .12	4 ± 15	17 ± 1.2
3	0.55 ± .28	10 ± 4.3	0.41 ± 0.41	19	0.20 ± .18	2 ± 6.3	0.08 ± 1.1
3A	0.26 ± .20	7 ± 4.6	0.10 ± 0.45	19A	0.16 ± .17	9 ± 6.3	0.16 ± 0.59
4	0.36 ± .23	16 ± 5.1	3.0 ± 0.54	20	0.10 ± .09	9 ± 6.3	0.51 ± 0.62
4A	0.20 ± .18	26 ± 7.1	0.19 ± 0.60	20A	0.10 ± .14	2 ± 5.3	0 ± 0.53
5	0.03 ± .11	10 ± 5.8	1.3 ± 0.60	21	0.42 ± .25	17 ± 5.5	0.31 ± 0.50
6	0.29 ± .23	11 ± 7.6	1.1 ± 0.77	22	0.03 ± .12	23 ± 6.6	0.07 ± 0.58
7	0.20 ± .18	8 ± 5.5	0.96 ± 0.50	23	0.96 ± .37	8 ± 5.2	0.80 ± 0.53
8	0.20 ± .18	21 ± 6.3	0.08 ± 0.56	23A	0.16 ± .17	8 ± 5.8	3.4 ± 5.5
8A	0.23 ± .13	8 ± 5.6	0.32 ± 0.54	24	0.22 ± .20	8.3 ± 5.2	2.6 ± 5.9
9	0.20 ± .18	12 ± 5.8	0.08 ± 0.55	25	0.32 ± .22	5 ± 5.4	1.8 ± 0.69
9A	0.32 ± .22	12 ± 5.5	0.62 ± 0.52	26	0.00 ± .09	4 ± 5.6	1.1 ± 0.60
10	0.26 ± .21	18 ± 5.5	17 ± 2.1	27	0.36 ± .24	11 ± 5.7	0 ± 0.54
11	0.16 ± .17	13 ± 6.0	5.9 ± 0.58	28	0.16 ± .19	8 ± 5.8	0.19 ± 5.5
12	0.13 ± .16	13 ± 5.8	0.77 ± 0.56	29	0.03 ± .12	15 ± 6.7	0.64 ± 0.59
13	0.32 ± .22	19 ± 8.8	11.0 ± 2.1	30	0.06 ± .13	9 ± 5.6	0.68 ± 0.53
14	0.23 ± .22	8 ± 5.5	1.4 ± 0.57	31	0.16 ± .17	20 ± 6.4	1.2 ± 0.61
14A	0.07 ± .08	13 ± 7.3	0.18 ± 0.68	32	0.03 ± .12	7 ± 5.0	1.0 ± 0.52
15	0.36 ± .25	19 ± 8.0	0.13 ± 0.72				

REFERENCE:
25-Mile Radius Vegetation - 1982

	Maximum Concentration, pCi/g
Alpha	0.92±0.38
K-40	8.3± 6.6
Cs-134,137	1.1±0.9

Table HP-9

TRITIUM IN SURFACE WATER (SAVANNAH RIVER)

SAVANNAH RIVER PLANT

(pCi/l)

Station		GDNR DATA Min	Mean	Max	SRP[a] DATA	GDNR Max Date	
Background	1	200	220	300	690	2/82	
	2	200	316	700	370	5/82	Upstream
Indicator	1	200	285	600		2/82	
	2	200	283	400		2/81	
	3	300	1860	4200	4600	12/81	
	4	200	1980	3500	4300	12/81	
	5	400	2900	6000		12/81	Downstream
	6	400	4240	7100		12/81	
	7	2300	3867	8800	10,000	1/82	
	8	1700	3086	5000		12/81	

	Summary, pCi/ℓ GDNR Max	GDNR Min	SRP Max	SRP Min	SRP Mean
Upstream					
1982	700	200	3800	<300	360
Downstream					
1981	7100	200	9200	1600	4100
1982	8800	200	10,000	1900	4300

[a] Data in parentheses are comparable SRP data for the period in which the GDNR sample was collected.

TABLE HP-11

TRITIUM LEVELS IN MILK FROM

DAIRIES AROUND THE SAVANNAH RIVER PLANT

(pCi/l)

L O C A T I O N

	WAYNESBORO, GA		GIRARD, GA		GRACEWOOD, GA	
	BOYCE		DIXON		GRACEWOOD	
Sample Date	GDNR	SRP[a]	GDNR	SRP[a]	GDNR	SRP[a]
6/12/80	-		700±200	-	-	-
3/5/81	-		1200±200	1160	-	
6/18/81	-		<200	<450	-	-
7/16/81	<200	<400	500±100	710	-	-
8/20/81	<200	-	-		-	-
9/10/81	-		300±200	<450	-	-
10/8/81	400±200	<400	400±200	<450	-	-
11/5/81	600±200	690	<200	810	400±200	500
12/3/81	1600±200	-	<200	<450	-	-
1/28/82	500±300	<450	1200±300	1360	-	-
2/5/82	1000±200	1490	1100±200	1000	500±200	630
3/25/82	-		800±200	940	-	-
4/1/82	300±200	800	-		-	-
4/22/82	900±200	1400	900±200	1400	-	-
5/20/82	<200	<450	600±200	<450	-	-
5/24/82	-	-	-		300±200	<450
6/17/82	300±200	450	1000±200	1390	-	-

[a] Comparable SRP data.

TABLE HP-13
SAVANNAH RIVER SWAMP
STEEL CREEK TO LITTLE HELL LANDING
TLD RADIATION MEASUREMENTS

River Mile	Trail Number	Distance From River (Meters)	mR/Day Average Annual[a] Results 1972 - 1980	Sept.[b] 1981	Oct.[b] 1982
141.5	1	0	0.27 ± 0.03	0.20 ± 0.02	0.23 ± 0.02
		178	0.34 ± 0.07	0.35 ± 0.03	0.34 ± 0.03
		358	0.52 ± 0.09	0.50 ± 0.04	0.50 ± 0.04
		550	1.11 ± 0.21	1.13 ± 0.08	1.02 ± 0.07
		656	1.46 ± 0.25	1.08 ± 0.08	1.09 ± 0.08
		805	0.17 ± 0.03	0.17 ± 0.02	0.14 ± 0.01
140.8	2	0	0.21 ± 0.03	0.24 ± 0.02	0.23 ± 0.02
		207	0.25 ± 0.03	0.23 ± 0.02	0.28 ± 0.03
		406	0.24 ± 0.03	0.26 ± 0.02	0.27 ± 0.02
		598	0.25 ± 0.02	0.23 ± 0.02	0.29 ± 0.03
		798	0.33 ± 0.04	0.35 ± 0.03	0.38 ± 0.03
		945	0.59 ± 0.04	0.50 ± 0.04	0.51 ± 0.04
		975	0.18 ± 0.02	0.16 ± 0.02	0.19 ± 0.02
139.5	3	0	0.23 ± 0.03	0.22 ± 0.02	0.23 ± 0.02
to		281	0.25 ± 0.06	0.25 ± 0.02	0.28 ± 0.03
140.8		627	0.24 ± 0.01	0.21 ± 0.02	0.23 ± 0.02
139	4	0	0.28 ± 0.02	0.26 ± 0.02	0.24 ± 0.02
		293	0.29 ± 0.04	0.35 ± 0.03	0.34 ± 0.03
		380	0.39 ± 0.07	0.39 ± 0.03	0.42 ± 0.03
		515	0.39 ± 0.08	0.43 ± 0.03	0.43 ± 0.03
		580	0.82 ± 0.10	0.82 ± 0.06	0.80 ± 0.06
		729	0.30 ± 0.19	0.25 ± 0.02	0.25 ± 0.02
138.5	5	0	0.23 ± 0.04	0.26 ± 0.02	0.26 ± 0.02
		534	0.34 ± 0.04	0.36 ± 0.03	0.35 ± 0.03
		573	0.58 ± 0.05	0.56 ± 0.04	0.55 ± 0.04
		640	1.05 ± 0.14	1.03 ± 0.07	1.00 ± 0.07
		773	0.25 ± 0.03	0.24 ± 0.02	0.28 ± 0.03

- No Analysis

[a] The average values are accompanied by a plus or minus (±) limit value, which is the 2 sigma standard deviation of the average.

[b] The individual 1981 and 1982 results are accompanied by a ± value which represents the statistical counting error at the 95% confidence level.

TABLE HP-14
SAVANNAH RIVER SWAMP -- STEEL CREEK TO LITTLE HELL LANDING
RACIOACTIVITY IN SOIL

Location		Distance From	pCi/g (dry weight) ^{137}Cs				
River Mile	Trail Number	River Meters	1974 0-6 cm	1975 0-8 cm	1976 0-8 cm	1977 0-8 cm	1982 0- cm pCi/ml
141.5	1	0	31	41			
		178	23	14	21	18	13.1 ± 0.36
		358	126	46			
		550	345	261	174	100	114.7 ± 0.95
		656	194	75			
		805	3	1	1	1	0.57 ± 0.07
140.8	2	0	1	1			
		207	2	3	2	3	1.92 ± 0.17
		406	4	3			
		598	9	4			
		798	47	18			
		945	122	73	5	38	84.69 ± 0.79
		975	3	1	1	9	2.21 ± 0.16
139.5	3	0	<1	2	<1	1	1.48 ± 0.18
to		281	5	2	2	2	2.74 ± 0.21
140.8		627	4	1	1	1	0.20 ± 0.08
139	4	0	1	2			
		293	13	19	18	19	20.17 ± 0.43
		380	86	61			
		515	72	55			
		580	187	98		171	112.8 ± 1.08
		729	2	2	44	2	1.15 ± 0.14
138.5	5	0	1	1			
		534	34	13	<1	27	31.8 ± 0.55
		573	140	86			
		640	260	141	<1	99	158.1 ± 1.16
		773	1	2	<1	1	1.13 ± 0.13
137	6	0	1	2			
		549	50	29	27	23	14.24 ± 0.39
		701	160	124			
		772	300	123	93	196	123.0 ± 1.26
		817	4	1	3	3	2.05 ± 0.14
136.3	7	0	2	1			
		579	6	3	3	6	2.96 ± 0.20
		793	527	26	159	173	52.6 ± 0.80
		823	3	2	2	3	53.73 ± 0.72
		944					15.84 ± 0.38
		975					2.07 ± 0.22
135.7	8	0	12	1			
		168	4	1	2	2	1.87 ± 0.17
		279	1	2			
		445	5	2			
		612	6	2			
		814	63	37	32	35	26.6 ± 0.52
		884	114	5			
		915	5	2	4	3	0.89 ± 0.17
135.5	9	0	2	1			
		512	120	57			
		621	134	111	74	92	69.97 ± 0.83
		671	1	92	117	105	56 ± 0.7
		762		1	2	2	2.0 ± 0.2
134.4	10	0		24	28	30	22.67 ± 0.55
		30	51	36	34	27	29.62 ± 0.51
		73	5	2	4	4	2.54 ± 0.19
Control (100 mi. from plant)			0.8	0.3	1	1	0.49 ± 0.04

Blank data space indicates no analysis.

TABLE HP-16
RADIOACTIVITY IN AQUATIC SPECIES FROM
LAKES IN SAVANNAH RIVER SWAMP,[a] pCi/g (wet wt)

	Species or type	Number of Fish	Flesh ^{137}Cs Max	Flesh ^{137}Cs Avg	Bone $^{89,90}Sr$
Trail 2 Boggy Gut Lake					
1974	Composite[b]	7	6.1	3.8	
1975	Bass	6	4.5	2.6	
	Bream	2	1.7	1.4	6[b]
1977	Catfish	2	0.2	0.2	<5
	Bream	3	0.2	0.1	<4
1982	Bream	5	0.9 ± 1.1	0.4 ± 0.6	
Trail 7 Jacks Lake					
1974	Composite[b]	7	5.8	4.0	
1975	Bass	1	4.5	4.5	4[b]
	Bream	2	2.1	1.3	
1977	Bream	1	<0.1	<0.1	<5
	Carp	1	<0.1	<0.1	<5
	Crappie	1	<0.6	<0.6	8
1982	Bass	1	0.5 ± 0.3	0.5 ± 0.3	
	Bream	5	0.7 ± 1.1	0.4 ± 0.3	
	Jack	2	0.5 ± 0.1	0.4 ± 0.1	
	Sucker	2	0.2 ± 0.2	0.2 ± 0.1	
	Crappie	1	0.3 ± 0.4	0.3 ± 0.4	
	Turtle	1	0.2 ± 0.2	0.2 ± 0.2	
Trail 8 Cannuck Lake					
1974	Composite[b]	14	6.1	3.8	
1975	Bream	5	3.8	2.2	5
1977	Catfish	1	<0.1	<0.1	9
1982	Bream	8	0.6 ± 0.8	0.3 ± 0.3	
	Jack	1	0.1 ± 0.3	0.1 ± 0.3	
	Sucker	1	0.6 ± 0.4	0.6 ± 0.4	
	Crappie	1	0.3 ± 0.1	0.3 ± 0.1	
	Turtle	2	0.5 ± 0.2	0.4 ± 0.03	
Control River 2					
1974	All species[c]	89	1.8	1.1	5
1975	All species[c]	41	2.4	0.1	5
1976	Catfish	6	<0.1	<0.1	<3
1977	Bream	8	<0.1	<0.1	3
	Catfish	9	<0.1	<0.1	2
1982	Catfish	7	0.2	<0.08	

[a]No fish collected in 1976.
[b]Composite of all species.
[c]Catfish, bream, and bass.
Blank data space indicates no analysis

TABLE HP-19

FECAL COLIFORM BACTERIA, COUNTS/100 ml[a]

	March			Year-to-date		
			Geometric[c]			
	Max[b]	Min[b]	Mean	Max[b]	Min[b]	Avg[d]
River 2, above plant	530	100	223	560	68	234
River 10, below plant	220	78	101	430	40	115
Upper Three Runs at Road F	580	40	130	580	21	96
Upper Three Runs at Road A	190	66	97	800	40	109
Four Mile at Road A	110	0	8	110	0	7
Pen Branch at Road A	110	4	38	110	0	16
Steel Creek at Road A	130	54	86	160	56	89
Beaver Dam Creek near swamp	600	78	94	600	30	44
Lower Three Runs at Road A	130	62	102	510	62	151
Lower Three Runs at Tabernacle Church Road	240	80	153	380	80	198

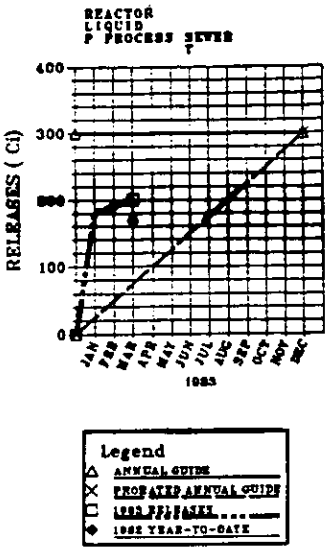
[a] Weekly analyses. Location of sample points are shown in Appendix A, Figure HP-6.

[b] Maximum and minimum values for weekly analyses.

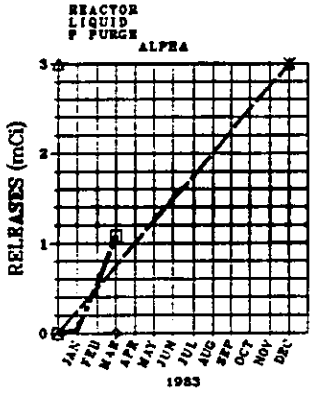
[c] Geometric mean of weekly values. The standard for South Carolina states that the fecal coliform count should:
Not exceed a geometric mean of 1000/100ml based on five consecutive samples during any 30 day period; nor to exceed 2000/100ml in more than 20% of the samples examined during such period (not applicable during or following periods of rainfall).

[d] Average of monthly geometric means.

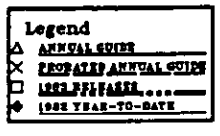
TABLE HP-21

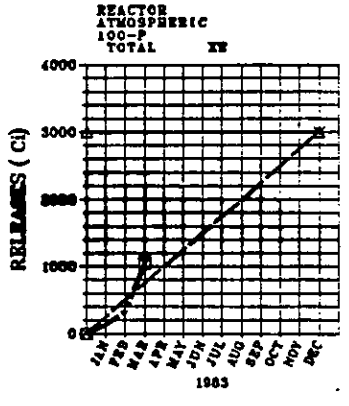


PROBABLE CAUSE: RESULTED FROM PUMPING LIQUID FROM THE DISTILLATION PAD HOLDING TANK IN JANUARY. MARCH RELEASES WERE NORMAL.



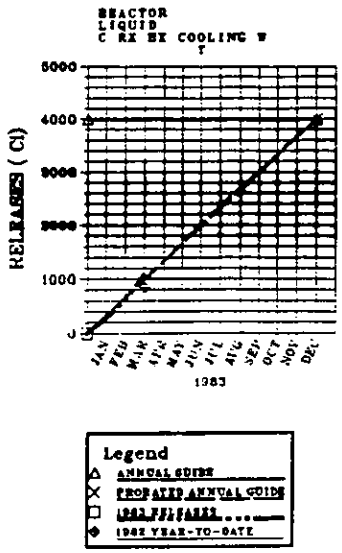
PROBABLE CAUSE: PROCEDURAL PURGE REQUIRED TO REDUCE TRITIUM CONCENTRATIONS.



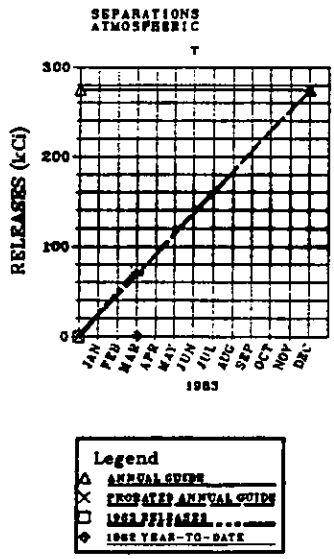


PROBABLE CAUSE: MARK 31-A TARGET FAILURE 3/2/83.

TABLE HP-21, continued



PROBABLE CAUSE: SEVERAL SMALL RELEASES DURING MARCH.



PROBABLE CAUSE: NORMAL OPERATIONS THAT CAUSED RELEASES TO REMAIN CLOSE TO THE GUIDE.

TABLE HP-22

REACTOR AREA RADIOACTIVE RELEASES — MARCH 1983

LIQUID
P PURGE

REPORT PERIOD	T CI	P-32 MCI	S-35 MCI	CR-51 MCI	CO-58,60 MCI	SR-89 MCI	SR-90 MCI	Y-91 MCI
	495.909	0.407	15.496	7.560	-	-	-	-
1/12 ANNUAL GUIDE	750.000				0.250		0.416	
YEAR TO DATE TOTAL	1228.632	0.407	24.968	13.635	-	-	-	-
PRORATED YTD GUIDE	2250.000				0.750		1.250	
ANNUAL GUIDE	9000.000				3.000		5.000	

REPORT PERIOD	ZR-95 NB-95 MCI	RU-103 106 MCI	SB-124 125 MCI	I-131 MCI	CS-134 MCI	CS-137 MCI	CE-141 144 MCI	PM-147 MCI
	4.069	-	0.543	-	-	4.445	4.935	-
1/12 ANNUAL GUIDE		0.416			0.833	6.250		0.500
YEAR TO DATE TOTAL	7.736	-	1.368	-	1.769	13.821	7.851	-
PRORATED YTD GUIDE		1.250			2.500	18.750		1.500
ANNUAL GUIDE		5.000			10.000	75.000		6.000

REPORT PERIOD	B OR G MCI	ALPHA MCI	VOLUME LITERS
	32.810*	0.540*	2.679E+06
1/12 ANNUAL GUIDE	29.166	0.250	
YEAR TO DATE TOTAL	53.723	1.081*	6.549E+06
PRORATED YTD GUIDE	87.500	0.750	
ANNUAL GUIDE	350.000	3.000	

LIQUID
K PURGE TO 904-88G

REPORT PERIOD	T CI	P-32 MCI	S-35 MCI	CR-51 MCI	CO-58-60 MCI	SR-89 MCI	SR-90 MCI	Y-91 MCI
	585.305	-	-	-	-	-	-	-
1/12 ANNUAL GUIDE	750.000				0.250		0.416	
YEAR TO DATE TOTAL	585.333	-	-	-	-	-	-	-
PRORATED YTD GUIDE	2250.000				0.750		1.250	
ANNUAL GUIDE	9000.000				3.000		5.000	

REPORT PERIOD	ZR-95 NB-95 MCI	RU-103 106 MCI	SB-124 125 MCI	I-131 MCI	CS-134 MCI	CS-137 MCI	CE-141 144 MCI	PM-147 MCI
	-	-	-	-	-	-	-	-
1/12 ANNUAL GUIDE		0.416	1.000		0.833	6.250		0.500
YEAR TO DATE TOTAL	-	-	-	-	-	-	-	-
PRORATED YTD GUIDE		1.250	3.000		2.500	18.750		1.500
ANNUAL GUIDE		5.000	12.000		10.000	75.000		6.000

REPORT PERIOD	B OR G MCI	ALPHA MCI	VOLUME LITERS
	-	0.368*	1.998E+05
1/12 ANNUAL GUIDE	29.166	0.250	
YEAR TO DATE TOTAL	-	0.408	3.083E+05
PRORATED YTD GUIDE	87.500	0.750	
ANNUAL GUIDE	350.000	3.000	

= ACCURACY NOT ALWAYS IMPLIED BY NUMBER OF SIGNIFICANT DIGITS
* EXCEEDS PERIOD AND/OR YTD GUIDES
- LESS THAN SENSITIVITY OF ANALYSIS
MCI = MILLICURIES

TABLE HP-22, continued

REACTOR AREA RADIOACTIVE RELEASES — MARCH 1983

LIQUID
100-L TO STREAM

REPORT PERIOD	T CI	CO-60 MCI	SR-90 MCI	CS-134 MCI	CS-137 MCI	OTHER B OR G MCI	ALPHA MCI	WATER VOLUME LITERS
	0.085	0.019	-	-	0.001	-	-	5.079E+02
1/12 ANNUAL GUIDE	41.666		0.833		2.083	2.083	0.250	
YEAR TO DATE TOTAL	0.239	0.097	-	-	0.249	-	0.008	6.950E+04
PRORATED YTD GUIDE	125.000		2.500		6.250	6.250	0.750	
ANNUAL GUIDE	500.000		10.000		25.000	25.000	3.000	

LIQUID
P RX HX COOLING W

REPORT PERIOD	T CI	WATER VOLUME LITERS
	235.000	3.319E+10
1/12 ANNUAL GUIDE	333.333	
YEAR TO DATE TOTAL	607.000	8.639E+10
PRORATED YTD GUIDE	1000.000	
ANNUAL GUIDE	4000.000	

LIQUID
K RX HX COOLING W

T CI	WATER VOLUME LITERS
412.000#	3.319E+10
333.333	
873.000	8.229E+10
1000.000	
4000.000	

LIQUID
C RX HX COOLING W

T CI	WATER VOLUME LITERS
486.000#	3.279E+10
333.333	
1097.000#	8.519E+10
1000.000	
4000.000	

LIQUID
600-G SEEPAGE BASIN

REPORT PERIOD	T CI	CO-60 MCI	SR-90 MCI	CS-137 MCI	OTHER B OR G MCI	ALPHA MCI	VOLUME LITERS
	-	-	-	-	-	-	0.000E+03
1/12 ANNUAL GUIDE	8.333	0.083	0.083	0.083	0.166	0.083	
YEAR TO DATE TOTAL	0.005	0.018	-	-	-	0.001	2.269E+04
PRORATED YTD GUIDE	25.000	0.250	0.250	0.250	0.500	0.250	
ANNUAL GUIDE	100.000	1.000	1.000	1.000	2.000	1.000	

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EXCEEDS PERIOD AND/OR YTD GUIDES
- LESS THAN SENSITIVITY OF ANALYSIS
MCI = MILLICURIES

TABLE HP-23, continued

REACTOR AREA RADIOACTIVE RELEASES — MARCH 1983

	ATMOSPHERIC 100-C							
	T CI	AR-41 CI	KR-85M CI	KR-87 CI	KR-88 CI	TOTAL KR CI	STACK I-131 MCI	DISS'Y I-131 MCI
REPORT PERIOD	3355.000	555.000	20.000	15.000	30.000	65.000	-	-
1/12 ANNUAL GUIDE	4166.666	2500.000				100.000	0.083	0.333
YEAR TO DATE TOTAL	8170.000	1250.000	45.000	30.000	60.000	135.000	-	-
PRORATED YTD GUIDE	12500.000	7500.000				300.000	0.250	1.000
ANNUAL GUIDE	50000.000	30000.000				1200.000	1.000	4.000

	XE-133 CI	XE-135 CI	TOTAL XE CI	OTHER B OR G MCI	TOTAL ALPHA UCI	STACK VOLUME CU M	DISS'Y VOLUME CU M
REPORT PERIOD	75.000	30.000	105.000	0.004	0.080	1.719E+08	9.175E+07
1/12 ANNUAL GUIDE			133.333	0.083	0.416		
YEAR TO DATE TOTAL	170.000	70.000	240.000	0.011	0.100	4.522E+08	2.982E+08
PRORATED YTD GUIDE			400.000	0.250	1.250		
ANNUAL GUIDE			1600.000	1.000	5.000		

= ACCURACY NOT ALWAYS IMPLIED BY NUMBER OF SIGNIFICANT DIGITS
M EXCEEDS PERIOD AND/OR YTD GUIDES
- LESS THAN SENSITIVITY OF ANALYSIS
MCI = MILLICURIES

TABLE HP-25

SEPARATIONS AREA RADIOACTIVE RELEASES — MARCH 1983

LIQUID TO STREAMS

REPORT PERIOD	T CI	SR-89 90 MCI	CS-134 137 MCI	OTHER B OR G MCI	TOTAL ALPHA MCI	WATER VOLUME LITERS
200-F EFFLUENT	1.030	0.270	1.910	1.660	0.240	2.7E+08
200-H EFFLUENT	6.130	0.520	1.050	0.490	0.090	8.7E+07
PERIOD TOTAL	7.160	0.790	2.960	2.150	0.330	3.6E+08
1/12 ANNUAL GUIDE	12.500	2.916	6.250	14.583	0.833	
YEAR TO DATE						
200-F EFFLUENT	3.160	1.290	5.420	5.590	0.680	9.2E+08
200-H EFFLUENT	14.820	1.230	3.910	12.010	0.210	1.7E+08
YTD TOTAL	17.980	2.520	9.330	17.600	0.890	1.1E+09
PRORATED YTD GUIDE	37.500	8.748	18.750	43.749	2.499	
ANNUAL GUIDE	150.000	35.000	75.000	175.000	10.000	

TABLE HP-26

SEPARATIONS AREA RADIOACTIVE RELEASES — MARCH 1983

ATMOSPHERIC RELEASES

REPORT PERIOD	T KCI	SR-89 90 MCI	ZR-95 MCI	NB-95 MCI	RU-103 MCI	RU-106 MCI	I-131 MCI	CS-134 MCI	CS-137 MCI
200-F STACKS	-	0.211	0.667	1.714	0.219	0.637	3.622	-	0.073
200-H STACKS	24.819	0.009	0.121	0.220	0.134	1.327	0.346	0.002	0.016
PERIOD TOTAL	24.819M	0.220	0.788	1.934	0.353	1.964	3.968	0.002	0.089
1/12 ANNUAL GUIDE	22.916	0.833	2.083	6.250	8.333	25.000	20.833	0.041	0.250
YEAR TO DATE									
200-F STACKS	-	0.503	1.692	3.836	0.521	1.637	4.679	-	0.172
200-H STACKS	73.634	0.009	0.563	0.749	0.352	2.547	0.695	0.005	0.056
772-F STACK	-	-	-	-	-	-	-	-	-
YTD TOTAL	73.634M	0.512	2.255	4.585	0.873	4.184	5.374	0.005	0.228
PRORATED YTD GUIDE	68.748	2.499	6.249	18.750	24.999	75.000	62.499	0.123	0.750
ANNUAL GUIDE	275.000	10.000	25.000	75.000	100.000	300.000	250.000	.500	3.000

REPORT PERIOD	CE-141 MCI	CE-144 MCI	OTHER B OR G MCI	AM-241 243 MCI	CM-242 244 MCI	U-235 238 MCI	PU-238 239 MCI	PU-238 MCI	PU-239 MCI	AIR VOLUME CU M
200-F STACKS	0.036	0.844	-	0.011	0.016	0.269	0.055	0.023	0.032	3.4E+08
200-H STACKS	-	0.191	-	0.003	0.003	0.013	0.134	0.122	0.012	2.2E+08
PERIOD TOTAL	0.036	1.035	-	0.014	0.019	0.282	0.189	0.145	0.044	5.7E+08
1/12 ANNUAL GUIDE	0.166	2.500	5.000	0.166	0.166	0.833	0.833			
YEAR TO DATE										
200-F STACKS	0.091	2.038	0.005	0.048	0.049	1.908	0.373	0.180	0.193	1.1E+09
200-H STACKS	0.031	0.667	-	0.017	0.015	0.063	0.488	0.389	0.100	7.7E+08
772-F STACK	-	-	-	-	-	-	-	-	-	0.0E+01
YTD TOTAL	0.122	2.705	0.005	0.065	0.064	1.971	0.861	0.569	0.293	1.8E+09
PRORATED YTD GUIDE	0.498	7.500	15.000	0.498	0.498	2.499	2.499			
ANNUAL GUIDE	2.000	30.000	60.000	2.000	2.000	10.000	10.000			

: ACCURACY NOT ALWAYS IMPLIED BY NUMBER OF SIGNIFICANT DIGITS
M EXCEEDS PERIOD AND/OR YTD GUIDES
- LESS THAN SENSITIVITY OF ANALYSIS
MCI = MILLICURIES

TABLE HP-29

TECHNICAL AREA RADIOACTIVE RELEASES — MARCH 1983

	LIQUID 773-A SEEPAGE BASIN T CI	SR-89,90 MCI	CS-134 137 MCI	OTHER B OR G MCI	U-235 238 MCI	U/PU MCI	PU-238 MCI	PU-239 MCI
REPORT PERIOD	-	-	-	-				
1/12 ANNUAL GUIDE	0.166	0.041	0.250	0.250		0.250		
YEAR TO DATE TOTAL	-	-	-	-	-	-	-	-
PRORATED YTD GUIDE	0.500	0.125	0.750	0.750		0.750		
ANNUAL GUIDE	2.000	0.500	3.000	3.000		3.000		

	OTHER ALPHA MCI	WATER VOLUME LITERS	ATMOSPHERIC 773-A T CI	CO-60 MCI	I-131 MCI	OTHER B OR G MCI	TOTAL ALPHA MCI	AIR VOLUME CU M
REPORT PERIOD	-	0.000E+03	-	0.028	0.209	0.001	-	2.713E+08
1/12 ANNUAL GUIDE	0.166		25.000	0.125	0.833	0.025	0.016	
YEAR TO DATE TOTAL	-	0.000E+03	-	0.048	0.520	0.001	0.002	8.141E+08
PRORATED YTD GUIDE	0.500		75.000	0.375	2.500	0.075	0.050	
ANNUAL GUIDE	2.000		300.000	1.500	10.000	0.300	0.200	

	LIQUID TIMS BRANCH A EFF B OR G MCI	TOTAL ALPHA MCI	WATER VOLUME LITERS
REPORT PERIOD	-	-	3.313E+07
1/12 ANNUAL GUIDE	0.166	0.083	
YEAR TO DATE TOTAL	-	0.015	9.941E+07
PRORATED YTD GUIDE	0.500	0.250	
ANNUAL GUIDE	2.000	1.000	

	LIQUID CMX-SEEPAGE BASIN B OR G MCI	U-235 238 MCI	WATER VOLUME LITERS
	-	-	6.799E+05
	0.041	0.083	
	-	-	2.039E+06
	0.125	0.250	
	0.500	1.000	

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* EXCEEDS PERIOD AND/OR YTD GUIDES
- LESS THAN SENSITIVITY OF ANALYSIS
MCI = MILLICURIES

TABLE HP-31

PLANT STREAMS WATER QUALITY

MARCH 31, 1983

PARAMETER	UNITS	CONCENTRATION CURRENT VALUE	CONCENTRATION YEAR - TO - DATE AVERAGE	CONCENTRATION YEAR - TO - DATE MAXIMUM	CONCENTRATION YEAR - TO - DATE MINIMUM	TRANSPORT, KG CURRENT PERIOD	TRANSPORT, KG YEAR - TO - DATE
U3R THERMAL EFF LAB							
WATER VOLUME	LITERS	1.700E+10		(4.900E+10 TOTAL)			
TEMPERATURE	DEG C	13	12	14	8.3		
PH	PH	6.4		6.4	5.8		
DISSOLVED O	MG/L	9.1	8.5	9.1	8.2	1.546E+05	4.186E+05
ALKALINITY	MG/L	6.0	5.7	6.0	5.0	1.019E+05	2.779E+05
CONDUCTIVITY	UMH/CM	22	21	22	21		
TURBIDITY	JTU	0.90	1.5	2.0	0.90		
SUSP SOLIDS	MG/L	3.0	3.3	6.0	1.0	5.099E+04	1.629E+05
VOLTL SOLIDS	MG/L	2.0	12	20	2.0	3.399E+04	5.939E+05
T DISSSOLIDS	MG/L	21	29	40	21	3.569E+05	1.428E+06
TOTAL SOLIDS	MG/L	24	33	46	24	4.079E+05	1.591E+06
FIXD RESIDUE	MG/L	1.0	13	26	1.0	1.699E+04	6.249E+05
COD	MG/L	6.0	13	21	6.0	1.019E+05	6.139E+05
CHLORIDE CL	MG/L	3.0	2.0	3.0	1.3	5.099E+04	9.899E+04
NO-2+NO-3 N	MG/L	0.07	0.07	0.07	0.07	1.189E+03	2.309E+03
SULFATE SO-4	MG/L	0.00	1.7	3.0	0.00		7.999E+04
TOTL PHOSP P	MG/L	0.02	0.02	0.02	0.02	3.399E+02	9.799E+02
ALUMINUM AL	MG/L	0.13	0.19	0.25	0.13	2.209E+03	6.209E+03
AMMONIA NH-3	MG/L	<0.00	<0.01	0.02	<0.00		6.399E+02
MAGNESIUM MG	MG/L	0.32	0.36	0.40	0.32	5.439E+03	1.183E+04
MANGANESE MN	MG/L	<0.05	<0.05	<0.05	<0.05		
SODIUM NA	MG/L	1.3	1.4	1.5	1.3	2.243E+04	4.611E+04
TOTL IRON FE	MG/L	0.00	0.21	0.42	0.00		6.719E+03
CHROMIUM CR	MG/L	<0.08	<0.08	<0.08	<0.08		
ZINC ZN	MG/L	<0.01	<0.01	<0.01	<0.01		
UPPER 3 RUNS ROAD A							
WATER VOLUME	LITERS	2.400E+10		(6.200E+10 TOTAL)			
TEMPERATURE	DEG C	12	11	14	7.7		
PH	PH	6.6		6.6	6.0		
DISSOLVED O	MG/L	88	35	88	8.0	2.111E+06	2.431E+06
ALKALINITY	MG/L	6.0	6.3	8.0	5.0	1.439E+05	3.939E+05
CONDUCTIVITY	UMH/CM	23	22	23	21		
TURBIDITY	JTU	0.90	1.5	2.1	0.90		
SUSP SOLIDS	MG/L	5.0	4.3	6.0	2.0	1.199E+05	2.759E+05
VOLTL SOLIDS	MG/L	3.0	14	22	3.0	7.199E+04	8.359E+05
T DIS SOLIDS	MG/L	23	30	40	23	5.519E+05	1.855E+06
TOTAL SOLIDS	MG/L	28	35	46	28	6.719E+05	2.131E+06
FIXD RESIDUE	MG/L	2.0	13	24	2.0	4.799E+04	7.439E+05
COD	MG/L	13	15	18	13	3.119E+05	9.059E+05
CHLORIDE CL	MG/L	3.0	2.3	3.0	1.9	7.199E+04	1.461E+05
NO-2+NO-3 N	MG/L	0.06	0.06	0.06	0.06	1.439E+03	2.639E+03
SULFATE SO-4	MG/L	0.00	1.3	2.0	0.00		7.599E+04
TOTL PHOSP P	MG/L	0.04	0.03	0.04	0.02	9.599E+02	1.359E+03
ALUMINUM AL	MG/L	0.18	0.21	0.24	0.18	4.319E+03	9.119E+03
AMMONIA N	MG/L	0.01	0.02	0.02	0.01	2.399E+02	9.999E+02
MAGNESIUM MG	MG/L	0.32	0.31	0.32	0.30	7.679E+03	1.367E+04
MANGANESE MN	MG/L	<0.05	<0.05	<0.05	<0.05		
SODIUM NA	MG/L	1.5	1.5	1.5	1.5	3.599E+04	6.519E+04
TOTL IRON FE	MG/L	0.00	0.21	0.42	0.00		8.399E+03
CHROMIUM CR	MG/L	<0.08	<0.08	<0.08	<0.08		
ZINC ZN	MG/L	<0.01	<0.01	<0.01	<0.01		

ACCURACY NOT ALWAYS IMPLIED BY NUMBER OF SIGNIFICANT DIGITS