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REPORT FOR OCTOBER 1955

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MARTIN MARIETTA ENERGY SYSTEMS LIBRARIES
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TABLE 1

GRAPHITE REACTOR OPERATIONS

Period 10-1-55 to 10-31-55

	This Month	Last Month	Year to Date
Total energy, Mwd	97.2	92.1	956.4
Average power, kw /Operating Hour	3,440	3,359	3,429
Time operating, %	91.2	91.4	91.7
Excess reactivity, inhr	123	129	
Slugs charged	123	143	1,154
Slugs discharged	173	143	1,167
Input air temperature (av), °F	53.3	72	
Exit air temperature (av), °F	166.5	179	
Exit air filters, Δp, in. H_2O	3	4.9	
Canal water radioactivity, counts/min/ml	1,300	2,000	
Total facilities assigned, %	77	82	
Facilities in use for research, %	48	56	
Facilities in use for radioisotopes, %	21	20	
Research samples	144	72	1,376
Radioisotope samples	278	204	2,366

GRAPHITE REACTOR

There were two slug ruptures in October, bringing the total number of ruptured slugs found in 1955 to 18. Data on the ruptured slugs are:

Rupture No.	Date	Row No.	Days in Reactor	Approx. Temp.	No. from West End of Row	
146	10-10-55	1873	281	200° C	4	Found by visual inspection.
147	10-17-55	1164	1267	220° C	27	Found by visual inspection.

A total of 13,044 slugs were shipped from the canal to the Metal Recovery Building and approximately 5,000 remain in the canal. The number of ruptures found among slugs that were shipped this month was 1.3%; however, a considerable number of ruptured slugs were completely disintegrated to the oxide, so that it was impossible to determine their exact number. Ruptures undoubtedly total more than 2% among the slugs now being shipped. Several bins which have been used to store the slugs have been removed and it is now possible to begin pumping out some of the silt which covers the canal floor.

The south mattress plate is visibly damaged and a slug occasionally sticks under the neoprene mat during a discharge. It is planned to change it on November 7.

Five slices were cut from a uranium slug which had been discharged from the reactor for the Chemical Technology Division.

A shutdown was required on October 21 for repairing a water leak in the No. 3 fan motor cooling line.

Unscheduled shutdowns occurred during the month when the Hole 10 safety circuit failed--twice from instrument trouble at the core hole monitron, and once because of a radioactive source being removed from the core hole, actuating the scram through the core hole monitron.

TABLE 2

LITR OPERATIONS

Period 10-1-55 to 10-31-55

	This Month	Last Month	Year to Date
Total energy, Mwd	72.8	74.6	753.6
Average power, kw	2,984	2,992	2,981
Time operating, %	78.7	83.1	83.2
Excess reactivity, %	2.9	3.7	
Unscheduled shutdowns, hr	3.400	6.216	40.282
Regular shutdowns, hr	37.587	89.250	411.222
Research shutdowns, hr	117.333	26.302	779,747
Inlet water temperature (av), °F	91.7	94.5	
Outlet water temperature (av), °F	111.5	111.7	
Cooling water activity, counts/min/ml	42,000	45,000	
Cooling water resistivity, ohms	450,000	400,000	
Fuel pieces charged	1	2	11
Fuel pieces discharged	1	2	10
Total facilities assigned, %	100	100	
Facilities in use for research, %	45	55	
Facilities in use for radioisotopes, %	30	30	
Research samples	32	37	293
Radioisotope samples	38	43	400

LOW-INTENSITY TEST REACTOR

The LITR operated without trouble during October; however, the downtime was high (21.3%) because of experimental requirements at HB-4, where an HRP loop is being operated.

The filters in the 76-unit bypass filter were last changed on September 2, but appear to be failing again. Their average life is about two months. The cloth-type units now being used do not stand up well to radiation and it is planned to try some felt units bonded with plastic. The monobed ion column was regenerated on October 20, the anion pre-column on September 26, the north cation column on September 28, and the south cation column on October 13. When the cation resin was removed from the south cation unit, it was found to be so badly damaged that water would not flow through it, and the resin had a jelly-like consistency. The monobed column has been giving rather short runs, so the anion was removed and replaced with 18 cubic feet of new resin.

The flow of reactor water through the demineralizer clean-up system has been varied so that data can be obtained on the amount of sodium in the system at varying demineralizer rates. It is hoped that this will provide information to help determine the source of the radioactive sodium.

In order to accommodate more vertical-type experiments, plans are being made to cut additional holes in the side of "A" tank so that flexible metal tubes can be used which will not go through the top plug and thus will not have to be taken apart each time the top plug is removed.

The number of unscheduled shutdowns was rather high during the month. In an effort to reduce these, the safety circuit on the period was modified so that the period scram became less sensitive above N_L (1% full power). After this was done on October 21, the number of unscheduled shutdowns has been greatly reduced.

The remote control test equipment is in full operation, with all of the manipulation being done from the Graphite Reactor remote control panel, except during start-up. An operator will remain in the LITR control room, however, to assist the remote control panel whenever needed and to keep a record of any incidents which require his participation. After a suitable time, the data collected will be studied to decide whether further refinements to the control system are needed.

Design work is being started on the pneumatic tube to be installed in the west regulating rod hole of the beryllium reflector. This additional facility is badly needed because the pneumatic tube now used cannot handle all the required irradiations. Lately, however, the large amount of downtime has made the pneumatic tube considerably less useful.

Initial design work was done on a smaller upper grid which would not cover the fourth and fifth rows of the lattice. Such a grid would permit more vertical experiments in the reactor. These are now limited by the four holes in the grid. A preliminary estimate of $6,500 was obtained for the grid, and further work will be delayed until requirements for experimental facilities justify this expenditure.

RESEARCH REACTOR (ORR)

Progress by the contractor continued. A photograph of the construction area is shown below.

RADIOISOTOPE PRODUCTION AND SALES

Radioisotope Shipments are shown below.

	October 1955	September 1955	October 1954	Since August 1946
Processed Material	896	852	789	59,728
Irradiation Units	265	186	209	15,612
Total	1161	1038	998	75,340
Domestic	940	918	895	
Foreign	21	27	74	
AEC Projects	200	93	29	
Total	1161	1038	998	

Detailed data on radioisotope production and sales are given in Tables 3, 4, and 4A.

Seven cans, containing approximately 19,000 curies of Co^{60} were received from the MTR.

An invoice for $54,201.65, covering a previous shipment of cobalt, was processed for payment. A total of $167,466.86 has now been paid to the MTR for cobalt shipped to ORNL.

The new radioisotope catalog is receiving a final proof-reading and printing will be started soon.

Due to target costs, the following materials are being recovered from decayed products: enriched Fe^{58}, Fe^{54}, Ca^{44}, Cr^{50} and normal Sc. Thirty-two milligrams of Fe_2O_3 enriched in Fe^{54} and 11.1 milligrams of Fe_2O_3 enriched in Fe^{58} have been recovered to date.

Approximately 120 curies of Sr^{90} concentrate was removed from the fission product semi-works and placed in storage pending final purification.

Approximately 390 curies of rare earth concentrate was removed from the fission product semi-works and placed in storage pending final purification.

A Cs^{137} run is now in progress in the fission product semi-works and approximately 900 curies of Cs^{137} has been accumulated to date; 2000 curies will be accumulated before final purification.

The barricade that was being used for the final purification of Cs^{137} developed several leaks which could not be repaired and which created a serious contamination problem. The barricade was decontaminated and removed from the building. The lead will be recovered. Future final purification work will be conducted in a manipulator cell.

The first nickel-plated cobalt was received from the MTR. The nickel-plated material had only a small amount of cobalt oxide near the edges of the wafers, which is a vast improvement over the previously gold-plated material. Approximately 9500 cobalt wafers were nickel-plated in preparation for future irradiations.

All loading schemes for MTR cobalt irradiations were reviewed for methods of increasing the heat transfer from the cobalt. A decision was made to use slotted aluminum spacers in which the cobalt could be loaded to effect approximately the same geometry as in previous irradiations.

The multi-kilocurie cell was shut down for two days to remodel the funnels to the hot drains and to insert a self-draining, stainless steel liner on the worktable. A more powerful motor was also installed on the cobalt monitor during this shutdown.

RADIOISOTOPE DEVELOPMENT

One of the test pellets of Eu_2O_3 which have been irradiated in the LITR for the last $2\frac{1}{2}$ years, with periodic removal and measurement of the gamma radiation, was measured again. The sample had a radiation intensity of 5.8 rhm, as compared with the reading of 5.3 rhm obtained on January 24, 1955. It is evident that the sample is approaching saturation and the experiment will be terminated. Using these data, calculations will be made to redefine the limits of error of the present europium cross-section values.

Approximately 10 mc of Xe^{131m} was produced from 20 curies of I^{131} for special measurements to be made by the Physics Division. A special run was made in the iodine plant, utilizing 50 X-pile slugs, to obtain enough iodine to milk off the Xe^{131m} daughter. A report is being prepared on the procedure that was developed for the separation.

Small traces of Sr^{90} remain with the ammonium alum crystallized in the F3P process. Treatment of the slightly acid alum waste with $CaSO_4$ removes $\sim$50% of the Sr^{90} per pass and the method is being studied to see if it is suitable for plant treatment of the alum waste.

The Kr^{85} system is being revised to provide stainless steel seats in the pressure reducing valves. This is necessary because the traces of residual nitrogen oxide and moisture cause corrosion of the brass valves and the Koroseal valve seats were severely damaged by the radiation. Preparations are being made to start the largest run made so far (200 curies).

Studies have shown that P^{32} can be produced from sulfur with great efficiency in the LITR. Special cans and a holder for 6 of these cans were designed for irradiating sulfur in a half fuel element. Since the necessary production can be achieved with a few hundred grams of sulfur, a small vacuum distillation apparatus is being built to produce P^{32} by the distillation process rather than the pressure extraction process used at the present time.

FISSION PRODUCT PILOT PLANT (F3P)

Construction

The contractor began work on Phase I of this project on October 21, 1955. The only progress made thus far has been the laying of the compacted gravel backfill under the building site. The legal date of completion for the contract remains 260 days from starting date plus allowable delays (July 6, 1956).

The ORNL Engineering and Mechanical Division is continuing excavation for the cell ventilation and hot off-gas ducts.

Engineering

Complete drawings and specifications for Phase II of this project (equipment and vessel fabrication and installation) were transmitted to the AEC. The bid opening date for this contract is November 29. A pre-bid conference is scheduled for November 15.

SHIELDED TRANSFER TANK (STT)

Alterations to the STT were completed on October 24. A 48-curie Co^{60} source was placed inside the STT so that the Health Physics Division personnel could make a complete radiographic inspection of the container, using film. No defects were found. It is planned to pressure-test the tank and make a "hot" test filling from W-15.

The railroad car for transporting the STT to Arco has been scheduled to be delivered to Oak Ridge on November 15.

ARCO LOADING STATION

The intermediate transfer tank, which will be installed inside the Arco waste tank, was completed. The tank and jet assembly was set up and tested for operability. The results of the test were satisfactory.

All components fabricated or purchased by ORNL are scheduled to be shipped by November 2.

A synthetic solution of 1.8 M $Al(NO_3)_3$ with 1 ml of concentrated H_2O_2 in 5 liters of solution was tested under the actual conditions of temperature and pressure to be expected at Arco. A 4-liter flask was evacuated to 1.5" of mercury absolute pressure and placed at an elevation 15 feet above the foot tank, which simulated the intermediate transfer tank. A vacuum of 4.2" Hg was drawn on the foot tank to reproduce the lower atmospheric pressure at Arco. Since the transfer jet heats the liquid 20° C, transfers of the solution were made at 45° C, 50° C, 55° C, 60° C, and 65° C. Some gassing due to the H_2O_2, and steam

bubble formation in the transfer line due to the lowered pressure was observed. However, at the temperatures below 60° C, greater than the calculated amount of solution was transferred by opening the suction line to the evacuated flask and allowing the vacuum in the flask to suck in solution until the flow ceased. The surplus solution can probably be explained by the lowering of the apparent specific gravity in the suction line by gas and steam bubble formation.

The solution of 1.8 M $Al(NO_3)_3$ was made 1.8 M in NH_4NO_3 and 0.25 M acid deficient, and the transfer test was rerun at 60° C. No additional bubble formation or appreciable decrease in amount transferred was observed.

TABLE 3.
RADIOISOTOPE PRODUCTION AND SALES

Period 10-1-55 to 10-31-55

Symbols: I = irradiated unit; P = processed material; HSA = high specific activity; LSA = low specific activity; CF = carrier-free; E = enriched target; X = ORNL Graphite Reactor; FP = fission product

C-86 = 86" Cyclotron
W = Hanford
L = LITR
M = Arco
S = Scrup
B = Brookhaven

Product	Type	Source	Specific Activity	This Month		Year to Date	
				Produced	Sold	Produced	Sold
Antimony-122	I						
Antimony-124	I						2
Antimony-124	P-HSA				131.5	891	269.5
Antimony-125	I						1
Antimony-125	P-CF						5.2
Argon-37	P-CF					5,000	11
Arsenic-73,74	P-CF						
Arsenic-76	I				2		17
Arsenic-77	I						7
Barium-131	I						10
Barium-133	P-HSA				1	25	9
Barium-140	P-CF				10	2,103	930
Beryllium-7	P-CF						7
Bismuth-210	I						3
Bromine-82	I				4		35
Cadmium-115	I						1
Cadmium-115*m*	I						
Cadmium-115	P-HSA					20.2	21
Calcium-45	I				1		1
Calcium-45	P-LSA	L	1.1	309.7	164	309.7	448
Calcium-45	P-HSA	L	8.48	53	385	53	1,488
Calcium-45	P-E				9.5		53.5
Calcium-45	P-CF						0.013
Carbon-14	P				477	4,262	4,251
Cerium-141	I						2
Cerium-141	P-CF	X	CF	130	27	1,430	205
Cerium-144	P-CF				21	67,964	959
Cesium-134	I						
Cesium-134	P-HSA				27	3,094	1,932
Cesium-137	P-CF				2,107.5	3,675	22,684.5
Chlorine-36	I						13
Chlorine-36	P				1	90.9	3.8
Chromium-51	I				3		8
Chromium-51	P-HSA				517.5	18,276	6,701.5
Cobalt-57	P-CF	C-86	CF	37		37	22
Cobalt-58	P-CF					1.4	2
Cobalt-60	I						1
Cobalt-60	P-HSA				40	588	741
Copper-64	I						11
Europium-152,154	I						2
F. P. (gross)	P					4,230	1,034
Gallium-72	I				5		37

TABLE 3 (continued)
RADIOISOTOPE PRODUCTION AND SALES

Product	Type	Source	Specific Activity	This Month		Year to Date	
				Produced	Sold	Produced	Sold
Gold-198	I				95		711
Gold-199	I						1
Hafnium-181	I						5
H^3 (tritium)	P-CF				126,300		353,198
Indium-114	I						1
Indium-114	P-HSA					868	50
Iodine-129	P						0.001 g
Iodine-131	I						33
Iodine-131	P-CF	X, W	C.F	114,953*	52,715	938,530	549,807
Iridium-192	P-HSA						368
Iridium-194	I						
Iron-55,59	I				6		22
Iron-55,59	P-HSA	W	10	133	5.5	133	50.5
Iron-55	P-E				5	620	88
Iron-59	P-E	L	2,590	74	33.7	442.5	357.4
Krypton-85	P-CF					53,000	10,401
Lanthanum-140	I						7
Manganese-54	P-CF					49	19.5
Mercury-197	I						2
Mercury-203	I						10
Mercury-203	P-CF				120	11,213	787
Molybdenum-99	I				6		32
Neodymium-147	P-CF					19	3
Nickel-63	I						5
Nickel-63	P-HSA	C-86	1,866	390	5	774	66
Niobium-95	P-CF					214	45
Osmium-191	I						2
Palladium-109	I						2
Phosphorus-32	I				3		139
Phosphorus-32	P-HSA	X	40,000	10,150	13,749	156,995	134,000
Phosphorus-32	P-CF	X	C.F	285	66	1,014	368
Potassium-42	I				22		204
Potassium-42	P-HSA	L	284	161	18	752.5	251
Praseodymium-142	I						
Praseodymium-143	P-CF	W	C.F	102	0.5	102	0.5
Promethium-147	I						1
Promethium-147	P-CF	S	C.F	17,574		22,408	5,590
Rhenium-186	I						4
Rubidium-86	I				4		39
Ruthenium-97	I						
Ruthenium-103	P-CF					1,020	202
Ruthenium-106	P-CF						350
Samarium-153	I				1		3
Scandium-46	I						
Scandium-46	P-HSA					14,385	129
Selenium-75	I				2		2
Selenium-75	P-HSA				1	2,160	359

* 22,725 mc was made for production of Xe^{131} for Physics Division.

TABLE 3 (continued)
RADIOISOTOPE PRODUCTION AND SALES

Product	Type	Source	Specific Activity	This Month		Year to Date	
				Produced	Sold	Produced	Sold
Silver-110	I						1
Silver-110	P-HSA				11	2,301	620
Silver-111	I				7		32
Silver-111	P-CF						
Sodium-22	P-HSA					27.2	23.5
Sodium-22	P-CF				4		34.5
Sodium-24	I				28		231
Sodium-24	P-HSA	L	2,381	3,598	223	11,382.5	1,311
Strontium-85	P-CF					7.5	11.9
Strontium-89	I				2		5
Strontium-89	P-CF	W	C7	1,249	501	3,059	1,683
Strontium-90	P-CF				10,249		121,143
Sulfur-35	I						2
Sulfur-35	P-CF (SO_4^{--})				1,078	50,026	12,474
Sulfur-35	P-HSA (sulfide)				81	3,225	299
Sulfur-35	P-HSA (element)				175	3,500	758
Tantalum-182	I						
Tantalum-182	P-HSA					553	73
Technetium-99	I						
Technetium-99	P						1.2
Thallium-204	I						1
Thallium-204	P-HSA				3		1,697
Tin-113	P-HSA				1	39	117
Tungsten-185	I						
Tungsten-185	P-HSA	L	194	130	24	670	100
Tungsten-187	I						1
Yttrium-90	I						7
Yttrium-91	P-CF	W	C7	623	22	1,854	221
Zinc-65	I						1
Zinc-65	P-HSA				32.5		1,591.5
Zinc-65	P-CF				2	49	13
Zirconium-95	I				5		11
Zirconium-95	P-CF				130	3,990	1,043
Chromium-51	P-E						65
Carbon-14 Sheets					2	83	30
Carbon-14 Labelled Compounds							187
Gold-198	P	L	4,562	1,553	250	2,108	305
Bismuth-210	P	L	162.5	15	15	15	15
Service Irradiations					72		652
Europium-155	P				20		20
TOTALS	Processed Material, mc			151,519.7	209,759	1,399,638.4	1,242,074.5
	Irradiated Material, units				196		1,668
	Service Irradiations				72		652

TABLE 4
RADIOISOTOPE PRODUCTION AND SALES – SOURCES AND MISCELLANEOUS PRODUCTS

Period 10-1-55 to 10-31-55

Symbols: VHSA = very high specific activity * CF = carrier-free
HSA = high specific activity T = teletherapy
MSA = medium specific activity R = radiography
LSA = low specific activity IR = irradiator

Product	Type	Number of Sources	Use	Size of Sources		Sales	
				Minimum	Maximum	Month	Year
Antimony-beryllium	Neutron	2		3.5 c	3.5 c	7 c	25.5 c
Cesium-137	CF		T				1,501 c
Cesium-137	CF	1	R	10.5 c	10.5 c	10.5 c	474.3 c
Cesium-137	CF		IR				
Cobalt-60	VHSA		T				8,161 c
Cobalt-60	HSA		T				2,027 c
Cobalt-60	MSA	1	T	1,000.3 c	1,000.3 c	1,000.3 c	3,903.3 c
Cobalt-60	HSA		R				
Cobalt-60	MSA	2	R	2.5 c	9.6 c	12.1 c	76.4 c
Cobalt-60	LSA	15	R	3 mc	17.2 c	19.3 c	4,908 c
Cobalt-60	HSA		IR				413 c
Cobalt-60	MSA		IR				
Cobalt-60	LSA		IR				5,634 c
Iridium-192	HSA		R				
Iridium-192	MSA	31	R	1.9 c	90.2 c	493.1 c	2,804.1 c
Iron-55	HSA	1		4 mc	4 mc	4 mc	485 mc
Phosphorus-32	Plaques, 1 in.		IR				
Phosphorus-32	Plaques, 3 in.		IR				
Strontium-90	CF		IR				9 c
Tritium-zirconium	Evaporated target	18		364 mc	2.7 c	26.3 c	44.5 c
Tritium-zirconium	Fused target						24 c
Cobalt-60	LSA		T				847 c
Helium	Ampoules	4	High	20 cc	200 cc	470 cc	2,915 cc
Tritium	Ampoules	9		100 mc	50 c	126.3 c	**
Deuterium	Fused Targets						58 cc
Argon-37	Ampoules						**
Krypton-85	Ampoules	2		1,000 mc	2,000 mc		
D-Zr	Evap. Target	1		1 cc	1 cc	1 cc	1 cc

*Ranges of specific activity used for Co^{60}: VHSA - >40 c/g
HSA - 25-40 c/g
MSA - 10-25 c/g
LSA - Up to 10 c/g.

**See Table 3.

TABLE 4-A

COBALT-60 SOURCE PRODUCTION AND SALES

SIZE	GRADE	STORAGE INVENTORY CURIES	STORAGE INVENTORY PIECES	REACTOR INVENTORY GRAMS	REACTOR INVENTORY TOTAL CURIES	ORDERS FILLED	ORDERS ON FILE	CURIES FILLED	CURIES ON FILE
1/16" X 1/16"	10-25	504.5	977	28	210	1	0	0.5	0
1/8" X 1/8"	1-10	9,921	9,726	550	825	6	3	21.8	9,528
	10-25	281	116	74	555	1	0	5	0
1/8" X 1/4"	1-10	6,227	3,552	0	0	0	3	0	5,960
1/8" X 1/2"	1-10	9.8	3	0	0	0	0	0	0
1 cm X 1 cm	1-10	6,576	123	8,568	11,138	0	5	0	4,600
	10-25	0	0	3,780	4,914	0	0	0	0
1 cm X 2 mm	1-10	7,534	746	1,180	747	1	10	233	7,055
	10-25	7,113	338	300	4,725	1	10	1,000	7,000
	> 40	0	0	1,680	11,088	0	0	0	0
1 cm X 1 mm	10-25	0	0	400	6,300	0	32	0	18,530
	25-40	0	0	1,534	1,994	0	0	0	0
	> 40	0	0	708	920	0	0	0	0
2 cm X 1 mm	10-25	0	0	954.5	15,033	0	0	0	0
	25-40	2,548	42	0	0	0	2	0	2,100
	> 40	31,933	227	3,998	47,518	0	36	0	48,550
Sub-Totals	1-10	30,267.8	14,150	10,298.0	12,710				
	10-25	7,898.5	1,431	5,536.5	31,737				
	25-40	2,548.0	42	1,534.0	1,994				
	> 40	31,933.0	227	6,386.0	59,526				
Totals		72,647.3	15,850	23,754.5	105,967				

TABLE 5
WASTE DISPOSAL – WATER DEMINERALIZATION – HYDROGEN LIQUEFACTION SHIFT OPERATIONAL SERVICES – EQUIPMENT DECONTAMINATION ACTIVATION ANALYSIS – SF ACCOUNTING

Period 10-1-55 to 10-31-55

	This Month	Last Month	Year to Date	Total Last Year
Water through settling basin, gal	20,090,000	16,430,000	167,120,000	158,200,000
Activity through settling basin, curies	13.7	15.9	159.5	237.3
Water through retention pond, gal	600,000	690,000	6,780,000	6,090,000
Activity through retention pond, curies	0.5	2.9	18.5	17.2
Waste to lagoons, gal	82,000	158,000	1,434,000	997,000
Activity to lagoons, curies	881	1,135	18,963	7,224
Total activity in lagoons 2 and 3, curies	34,856	33,975	34,856	15,893
Demineralized water produced, gal	338,000	377,600	3,734,560	4,416,250
Liquid hydrogen produced, liters	4	1	85.1	135
Shift services for research division, man-hours	373	360	3,773	
Equipment decontamination services, man-hours	230	228	2,614	
Activation analyses completed	1	3	34	31
SF and special material receipts, number of lots	31	33	350	338
SF and special material shipped, number of lots	40	38	435	480
Number of research issuances *	0	0	19	62
Materials requests issued	6	6	110	196
SF and special materials reports issued	9	10	87	95
Internal audits and surveys	37	7	150	97

*Discontinued.

The excavation of waste storage pit No. 4, by a construction contractor, was started and completed this month. The tie-in of an overflow line from pit No. 2 and other minor items assigned to our Engineering and Mechanical Division must be completed before the pit is put into service.

The fan housing and impeller of the 60,000 cfm steam-driven emergency fan at the stack area were sand-blasted and repainted this month. The same maintenance work was also started on both the 60,000 cfm and 40,000 cfm electrically-driven fans.

The semi-annual inspection of the Cottrell precipitator was performed and several minor repairs were made.

WATER DEMINERALIZATION

After addition of seven inches of resin to the resin bed of the No. 2 anion column, the production of the column increased from about 15,000 gallons per cycle to 50,000 gallons. The production of all the units was very satisfactory during the month. The anion columns averaged between 40,000 and 60,000 gallons and the cation columns between 100,000 and 130,000 gallons.

HYDROGEN LIQUEFACTION

Four runs were made and four liters of liquid hydrogen were produced without incident.