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REPORT FOR AUGUST 1955

MARTIN MARIETTA ENERGY SYSTEMS LIBRARIES
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By

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OAK RIDGE NATIONAL LABORATORY
Operated by
UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation
Post Office Box P
Oak Ridge, Tennessee

[redacted]

[redacted]

[redacted]

[redacted]

TABLE 1

GRAPHITE REACTOR OPERATIONS

Period 8-1-55 to 8-31-55

	This Month	Last Month	Year to Date
Total energy, Mwd	91.4	96.6	767.1
Average power, kw /Operating Hour	3,211	3,392	3,465
Time operating, %	91.9	91.8	91.9
Excess reactivity, inhr	205	134	
Slugs charged	174	167	888
Slugs discharged	150	147	851
Input air temperature (av), °F	77	74.5	
Exit air temperature (av), °F	184	180.3	
Exit air filters, Δp, in. H_2O	4.8	4.7	
Canal water radioactivity, counts/min/ml	4,300	4,500	
Total facilities assigned, %	82	80	
Facilities in use for research, %	59	55	
Facilities in use for radioisotopes, %	20	21	
Research samples	129	154	1,160
Radioisotope samples	239	198	1,884

GRAPHITE REACTOR

There was one slug rupture during August, in channel 1472. Data are as follows:

Rupture No.	Date	Row No.	Days in Reactor	Approx. Temp.	Type	Lot No.	No. from West End of Row	Remarks
142	8-8-55	1472	1,218	220-266°C	Bonded	115	27	Thermocouple row. Indicated by high temperatures.

This brings the total number of ruptured slugs found in 1955 to 13.

The No. 2 fan motor was removed on August 1 and the new motor purchased last winter was installed in its place. Installation was completed the evening of August 3. Disassembly of the old motor showed that two copper buss bars in the rotor had broken. Considerable arcing had occurred at one of the breaks and the metal was fused. The arcing was apparently responsible for the sparks observed when the motor was being started. It will be necessary to weld the bars and have the motor balanced at K-25.

The control wiring for the Graphite Reactor is being repaired and components no longer used are being removed. At the same time, the wiring diagram is being checked and brought up to date.

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MARTIN MARIETTA ENERGY SYSTEMS LIBRARIES

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The canal continued to be a major source of personnel exposure. A large amount of work is being done in the canal at the present time in loading slugs for shipment to the Metal Recovery Building. Radiation comes principally from the canal walls, which have soaked up radioactive material from the canal water over a period of years. One bonded slug was cut into 15 slices for the Chemical Technology Division.

Approximately 24 slugs in the canal were found to be ruptured due to corrosion of the jackets. These were found while being transferred from bins to a carrier; in most cases the uranium was badly oxidized. This condition results in a considerable amount of fission products being stirred up in the canal water since the ruptured slugs generally fall apart when disturbed, releasing large quantities of uranium oxide.

A total of 7500 slugs were transferred to the Metal Recovery Building during August, bringing the total to date to 14,400. Approximately 28,300 slugs are still left in the canal.

TABLE 2

LITR OPERATIONS

Period 8-1-55 to 8-31-55

	This Month	Last Month	Year to Date
Total energy, Mwd	85.6	82.1	606.2
Average power, kw/Operating Hour	2,985	2,979	2,979
Time operating, %	92.5	88.9	87.2
Excess reactivity, %	2.5	3.7	
Unscheduled shutdowns, hr	1.301	2.900	30.666
Regular shutdowns, hr	33.801	37.850	284.385
Research shutdowns, hr	20.434	43.814	636.112
Inlet water temperature (av), °F	95.6	96.1	
Outlet water temperature (av), °F	112.2	112.2	
Cooling water reactivity, counts/min/ml	55,000	46,000	
Cooling water resistivity, ohms	413,000	450,000	
Fuel pieces charged	1	1	8
Fuel pieces discharged	1	1	7
Total facilities assigned, %	100	100	
Facilities in use for research, %	60	55	
Facilities in use for radioisotopes, %	30	25	
Research samples	41	48	224
Radioisotope samples	45	42	319

LOW-INTENSITY TEST REACTOR

Operation of the LITR was uneventful during August. Downtime was reduced to 7.5%, partly because the number of research shutdowns required was reduced considerably. Of the 55.536 hours the reactor was down during the month, 20.434 hours (2.7%) was due to experiments.

The installation of LITR remote control equipment is not yet complete. The panel in the Graphite Reactor control room was installed and most of the remaining work involves tie-ins in the LITR control room. A thorough program of testing the remote control system is being outlined; and until it is demonstrated that the system is operating properly, an operator will be kept at the LITR control room.

Instrument trouble in the period safety circuit resulted in five scrams during August; there were approximately three such scrams in July.

The 30-cubic-foot monobed resin column was regenerated on August 5 and on August 25. The north 2-cubic-foot cation column was regenerated on August 11. The monobed regeneration of August 5 gave an unusually short run of only 20 days instead of the usual six weeks. At

the time the 2-cubic-foot column was regenerated, it was found that the resin had decomposed sufficiently so that water would not flow through the column, and it was necessary to replace the resin.

The Geneva Reactor element removed from the lattice in July was taken from the reactor tank on August 16, after cooling approximately 3 weeks. A lead shield with approximately $5\frac{1}{4}$" of lead was used and the radiation was measured with a probe-type ionization chamber as 14 r/hr (the center of the chamber was approximately 2" from the shield). Inspection of the element in the hot cell later by members of the Solid States Division showed no significant corrosion.

RADIOISOTOPE PRODUCTION AND SALES

Radioisotope Shipments are shown below.

	August 1955	July 1955	August 1954	Since August 1946
Processed Material	825	759	826	57,980
Irradiation Units	219	209	240	15,161
Total	1044	968	1066	73,141
Domestic	954	868	960	
Foreign	15	15	96	
AEC Projects	75	85	10	
Total	1044	968	1066	

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

The C^{14} labeled compound sale was completed and all the compounds have been shipped. Three of the lots originally listed in the sale were withdrawn from the sale and sold at the Federal Agency price. The total income from all lots amounted to $8,924. This can be compared with $54,469, the previous retail price on these materials.

The radioisotope catalog has been turned over to the Information and Reports Division for editing and printing.

Six rods of cobalt have been placed in SRO facilities and an additional 10 rods will be inserted in the reactors in the near future. DuPont has recalculated the production rate and, based on this new calculation, they hope to discharge the first loading of cobalt in June of 1956 and the second loading of cobalt in July of 1956.

The new request for an additional 50,000 curies of cobalt, 20-curie-per-gram material, to be produced in the MTR has not yet been approved.

All outstanding orders for Kr^{85} have been filled. The AEC has been asked to reactivate the plant for producing crude Kr^{85}, since our supply is running low.

The AEC has requested a breakdown on all costs of irradiation, processing, selling and distributing radioactive materials incurred during fiscal year 1955. Work is progressing on this report, which is due on September 15.

New forms have been placed in use due to the company name change. We will continue to use our stockpile of shipping documents; however, the copy being sent to the customer is being stamped to indicate the company name change.

The fission products semi-works operations were resumed and approximately 200 liters of tank W-15 solution was processed for Tc^{99}, rare earths, Sr^{90} and Cs^{137}. The iron precipitate is being accumulated for Tc^{99} recovery; rare earths and Sr^{90} are being accumulated together for future separation. Approximately 600 curies of Cs^{137} has been separated at this time.

An analysis was made on the waste in tank W-20. This analysis indicated fluorides present to the extent of 0.0175 mg/ml. This waste will be unsuitable to run through the F3P evaporator since this constituent would present a serious corrosion problem.

Manipulator Cell No. 1 is back in operation after being out of operation for 3 weeks for refurbishing.

The cesium final purification cell is in operation and will operate until the 5000 curies of Cs^{137} on hand has been purified.

Cobalt slugs are being opened in the recently built Manipulator Cell No. 2 with a minimum of difficulty.

The Boltaron lining in Manipulator Cell No. 3 developed a crack in the wall section. The exact cause of this cracking was not determined; however, it was probably caused by a strain due to too much weight being placed on the shelf section above the wall. In order to strengthen the carrier table and relieve shock being delivered to the side walls from the table, anchors were made to attach to the door frame steel to the carrier table. The crack in the Boltaron was repaired by welding and the above-mentioned anchors installed with two days of cell down-time.

The rare-earth ion exchange fractionating columns were overhauled. This is the first major overhaul on this equipment in three years of operation.

RADIOISOTOPE DEVELOPMENT

One hundred grams of sulfur was irradiated one week in a LITR half fuel element to determine the yield of P^{32} in the high fast flux. The yield was ~100 mc/g S, so that with the usual 6 weeks' irradiation period roughly 300 times as much P^{32} per gram of S can be made in the LITR than in the Graphite Reactor; even better yields will be obtained in the ORR. This will allow a great simplification of P^{32} processing, and plans are being made to change our process accordingly during the next year.

Measurements were made on the total neutron emission from three Sb-Be neutron sources, using a $MnSO_4$ solution and estimating the leakage from the solution. All three sources gave approximately 6×10^6 n/sec at time of discharge from the Graphite Reactor. One of the sources is being shipped to the Bureau of Standards by the Physics Division and our measurement will permit a comparison with the calibration by the Bureau.

A test run was made for the recovery of Xe^{131} from I^{131}. One hundred millicuries of NaI^{131} was dried in a steel tube. Calcium metal was added and the tube was heated and evacuated. After five days, the tube was heated to vaporize the contents and free the xenon daughter; the I^{131} was retained in the calcium metal. Twenty-five microcuries of 11-day Xe^{131} was obtained.

Experimental NaCl pellets were made to see if a sufficiently compact Na^{24} could be made for radiographic work. A pellet 1 cm in diameter by 1.3 cm high contained 2.173 g (density 2.05 g/cc), which would contain about 3 curies of Na^{24} if irradiated in the LITR. This is slightly low for radiographic work, but an acceptable source can probably be made in the ORR.

Approximately 300 mc of Eu^{155} was separated from Pm^{147} and other impurities. A determination of the gammas was made; energies of 0.760 Mev, 1.06 Mev, 1.37 Mev (contributed by Eu^{152} and Eu^{154}) and 0.085 Mev (Eu^{155}) were found. Of the total gamma, 59.2% was contributed by $Eu^{152-154}$ and 40.8% was contributed by Eu^{155}. This indicates That the Eu^{155} found in reactor waste material would probably be of little value as an 85-kilovolt X-ray source, particularly in view of the much longer half-life of the $Eu^{152-154}$, 13-16 years versus 1.7 years for Eu^{155}.

Fission Product Pilot Plant (F3P)

Construction

The contract for Phase I construction of F3P was signed with Malan Construction Company on September 1, 1955.

Because of widespread contamination found in the earth to be excavated for the F3P tank farm and building foundations, it was decided that ORNL should remove all earth and rock containing contamination. ORNL began work on the excavation on August 11, 1955, and is scheduled to complete work on September 12, 1955.

As of August 31, 1955, excavation is complete in the building area, and excavation in the tank farm area will be complete on September 1. The excavation was taken below design elevation because of the unsuitable soil for footings at design elevation and because of deep penetration of contamination. It was found that extensive back-fill from previous excavations had been made in this area. A back-fill of concrete will be poured, and the building footings will be redesigned to the new elevation.

It was decided that the trench for the cell ventilation duct will be dug by ORNL for its full length.

Engineering

The schedule for completion of Phase II design is as follows: All drawings to be completed by September 16, 1955; all specifications to be completed by October 7, 1955; specifications and drawings to be transmitted to the AEC by October 14, 1955. There will be a total of 138 drawings issued for Phase II construction.

As of August 31, 1955, the status of design is as follows:

Vessel design - All drawings made except for solution makeup tanks. All drawings will require addition of miscellaneous details, and checking.

Piping design - Drawings of cells 2, 3, and 4 are complete and are being checked; drawings of cells 5, 6, and 7 are complete but unchecked; drawings of cells 8 and 9 are in progress; drawings of cells 21, 22, and 23 are 80% complete; cell 24 is 50% complete; the valve and jet pit is 80% complete; miscellaneous details are 75% complete; service headers are 50% complete; and line schedules are not started.

Instrument design - All drawings are complete and are being checked.

Makeup areas - Design is practically complete for makeup areas 31 and 32. The tanks will be elevated about 3 feet above the floor for gravity feed to the funnels. A platform with stairs will give access to the tops of the tanks for solids additions.

Chloride system off-gas scrubbers - The original intention to use Boltaron piping and valves in the manipulator cells off-gas system will not be possible because Boltaron will not withstand the high temperature gases from the drying ovens. Individual caustic scrubbers for each equipment unit using chlorides will be used. In addition, a large batch caustic scrubber will be installed in the off-gas header before it leaves the manipulator cell area.

Design studies are in progress on Cs^{137} purification and drying equipment. Tentative plans are for a 30-liter SST transfer vessel, a tantalum evaporator (30 liters), condenser, and neutralizer, and tantalum transfer vessels for transferring the product to drying ovens.

Equipment Development

Corrosion tests of stainless steel in a boiling solution of 0.5 M ammonium alum, 4 M HNO_3, and 0.4 M H_2SO_4 gave these results: Type 316 SST corroded at the rate of 0.004 IPY, Carpenter 20 at 0.0024 IPY, and Type 347 at 0.0022 IPY. In this test, the SST samples showed more resistance to this solution than a sample of Duriron tested previously, which showed 0.009 IPY, and a sample of 316 SST tested previously, which showed 0.0150 IPY corrosion rate. Several rechecks were run to test this apparent discrepancy, but no explanation could be found.

F3P HOPE Coordination

In conferences with the Chemical Technology Division, it was tentatively agreed that the F3P processing would be tied in with the HOPE plant processing as follows:

1. F3P will take care of all HAW waste from HOPE, either by evaporation or by neutralization before sending to W-5. Neutralization can be done in the condensate receiver tank, using facilities already designed, if there is sufficient shielding.

2. HOPE will take all condensate from F3P feed evaporator and recover HNO_3 from it in a concentrator to be installed in the HOPE plant. Sleeves, piping, and space for a pump will be provided in the valve and jet pit for the transfer from F3P to HOPE.

Waste Loading Station at ICPP

The official name of this project is ICPP Waste Station WM-180.

All drawings and bills of materials for this project were transmitted to Arco on August 19, 1955.

The parts of this project equipment to be fabricated by ORNL are scheduled to be started in the shops on October 3 and completed on October 17, 1955.

Process Development

Experiments were made to determine the solubility of ammonium alum in aluminum nitrate solutions. It was found that the solubility of ammonium alum in 2.0 M aluminum nitrate was 88.8 g/liter at 25° C. Ammonium alum therefore is approximately 60% as soluble in 2.0 M aluminum nitrate as in water where the solubility is 140 g/liter at 25° C. These results indicate that feed solution (aluminum waste) can be used to dissolve the ammonium alum which will be concentrated in the F3P evaporator.

TABLE 3.
RADIOISOTOPE PRODUCTION AND SALES

Period 8-1-55 to 8-31-55

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						1
Antimony-124	P-HSA						133
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						15
Arsenic-77	I				1		6
Barium-131	I				3		9
Barium-133	P-HSA					25	8
Barium-140	P-CF	X	CF	287	145	1,573	871
Beryllium-7	P-CF						7
Bismuth-210	I						3
Bromine-82	I				3		29
Cadmium-115	I				1		1
Cadmium-115*m*	I						
Cadmium-115	P-HSA					20.2	21
Calcium-45	I						
Calcium-45	P-LSA						264
Calcium-45	P-HSA				26		859
Calcium-45	P-E				2		43
Calcium-45	P-CF						0.013
Carbon-14	P				48	4,262	3,089
Cerium-141	I						1
Cerium-141	P-CF					1,300	178
Cerium-144	P-CF					67,964	808
Cesium-134	I						
Cesium-134	P-HSA				15	3,094	1,325
Cesium-137	P-CF				12,209	3,675	17,289
Chlorine-36	I				3		11
Chlorine-36	P					67.6	1.82
Chromium-51	I						5
Chromium-51	P-HSA	L	2,775	2,448	485	13,740	5,368
Cobalt-57	P-CF						12
Cobalt-58	P-CF	L	CF	1.4		1.4	2
Cobalt-60	I						1
Cobalt-60	P-HSA				75	588	608
Copper-64	I				1		10
Europium-152,154	I						2
F. P. (gross)	P	X	CF	2,000	164	4,230	877
Gallium-72	I				5		27

TABLE 3 (continued)
RADIOISOTOPE PRODUCTION AND SALES

Product	Type	Source	Specific Activity	This Month		Year to Date	
				Produced	Sold	Produced	Sold
Gold-198	I				87		546
Gold-199	I						
Hafnium-181	I						5
H^3 (tritium)	P-CF				108,910		223,898
Indium-114	I						1
Indium-114	P-HSA					385	31
Iodine-129	P						0.001g
Iodine-131	I						33
Iodine-131	P-CF	X	CF	83,380*	59,005	682,796	445,133
Iridium-192	P-HSA				15		334
Iridium-194	I						
Iron-55,59	I				5		10
Iron-55,59	P-HSA				1		45
Iron-55	P-E					620	57
Iron-59	P-E	L	1,618	50	31	325.5	274.7
Krypton-85	P-CF	M	CF	50,000		50,000	2,601
Lanthanum-140	I						7
Manganese-54	P-CF				1	49	19
Mercury-197	I						2
Mercury-203	I				1		9
Mercury-203	P-CF				124	10,280	513
Molybdenum-99	I				2		19
Neodymium-147	P-CF					19	3
Nickel-63	I						4
Nickel-63	P-HSA				4	384	54
Niobium-95	P-CF				1	171	34
Osmium-191	I				2		2
Palladium-109	I						2
Phosphorus-32	I				2		123
Phosphorus-32	P-HSA	X	40,000	13,650	12,918	128,796	106,642
Phosphorus-32	P-CF				1	652	246
Potassium-42	I				22		161
Potassium-42	P-HSA	L	189	239	126	482	199
Praseodymium-142	I						
Praseodymium-143	P-CF						
Promethium-147	I						1
Promethium-147	P-CF				12	3,848	5,538
Rhenium-186	I				3		4
Rubidium-86	I				3		33
Ruthenium-97	I						
Ruthenium-103	P-CF				30	944	194
Ruthenium-106	P-CF				10		314
Samarium-153	I						1
Scandium-46	I						
Scandium-46	P-HSA	L	171,250	14,385	4	14,385	109
Selenium-75	I						
Selenium-75	P-HSA				15	2,160	357

* 18,800 mc was diverted for production of Xe^{131} for the 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				30	2,301	376
Silver-111	I				2		23
Silver-111	P-CF						
Sodium-22	P-HSA					27.2	23
Sodium-22	P-CF				2		30.5
Sodium-24	I				20		186
Sodium-24	P-HSA	L	1,430	883	135	7,199.5	850
Strontium-85	P-CF				1	7.5	10
Strontium-89	I						3
Strontium-89	P-CF				60	1,810	1,025
Strontium-90	P-CF				19,951		99,837
Sulfur-35	I						2
Sulfur-35	P-CF (SO_4^{--})				1,653	50,026	10,933
Sulfur-35	P-HSA (sulfide)	W	48	3,225	56	3,225	206
Sulfur-35	P-HSA (element)				50	3,500	553
Tantalum-182	I						
Tantalum-182	P-HSA				1	553	68
Technetium-99	I						
Technetium-99	P				1		1.2
Thallium-204	I						1
Thallium-204	P-HSA				500		836
Tin-113	P-HSA					39	116
Tungsten-185	I						
Tungsten-185	P-HSA				1	540	76
Tungsten-187	I						1
Yttrium-90	I						2
Yttrium-91	P-CF	X	CF	174	20	1,231	192
Zinc-65	I						1
Zinc-65	P-HSA				639		1,396
Zinc-65	P-CF				3	49	11
Zirconium-95	I						6
Zirconium-95-Nb^{95}	P-CF	X	CF	1,393	514	2,469	913
Chromium-51	P-E					83	65
Service Irradiations					71		541
Carbon-14 Sheets					1		30
C^{14} Labelled Compounds					187		187
TOTALS	Processed Material, mc				218,181	1,074,895.7	935,974.4
	Irradiated Material, units				166		1,311
	Service Irradiations				71		541

TABLE 4
RADIOISOTOPE PRODUCTION AND SALES – SOURCES AND MISCELLANEOUS PRODUCTS

Period 8-1-55 to 8-31-55

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						15 c
Cesium-137	CF		T				1,501 c
Cesium-137	CF	1	R	5 mc	5 mc	5 mc	320 c
Cesium-137	CF		IR				
Cobalt-60	VHSA		T				6,684 c
Cobalt-60	HSA	1	T	100 c	100 c	100 c	2,027 c
Cobalt-60	MSA	1	T	568 c	568 c	568 c	2,251 c
Cobalt-60	HSA		R				
Cobalt-60	MSA	5	R	344 mc	3 c	4 c	42 c
Cobalt-60	LSA	38	R	24 mc	56 c	1,041 c	2,558 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	26	R	4 c	25 c	367 c	1,970 c
Iron-55	HSA						481 mc
Phosphorus-32	Plaques, 1 in.		IR				
Phosphorus-32	Plaques, 3 in.		IR				
Strontium-90	CF		IR				9 c
Tritium-zirconium	Evaporated target	1		1,200 mc	1,200 mc	1,200 mc	15.7 c
Tritium-zirconium	Fused target						24 c
Cobalt-60	LSA		T				847 c
Helium	Ampoules						1,245 cc
Tritium	Ampoules	15		50 mc	50 c	109 c	**
Deuterium	Fixed Targets						5.8 cc
Argon-37	Ampoules						**

*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	INVENTORY CURIES	INVENTORY PIECES	PRODUCTION RATE C/g/Month	PRODUCTION CURIES This Month	ORDERS FILLED	ORDERS ON FILE	CURIES FILLED	CURIES ON FILE
1/16" X 1/16"	10-25	514	978	2.5	37.5	1	0	100.4	0
1/8" X 1/8"	1-10	9,434	9,736	2.5	445	0	2	0	6,533
	10-25	319	132	0	0	0	0	0	0
1/8" X 1/4"	1-10	8,508	4,555	0	0	0	3	0	6,948
1/8" X 1/2"	1-10	10	3	0	0	0	0	0	0
1 cm X 1 cm	1-10	20,122	519	0	0	0	6	0	19,850
	10-25	0	0	2.5	9,450	0	0	0	0
1 cm X 2 mm	1-10	8,470	849	0	0	1	7	49	8,330
	10-25	8,665	412	1.5	450	1	14	568	10,608
1 cm X 1 mm	10-25	0	0	1.5	600	0	0	0	0
	25-40	0	0	1.5	531	0	22	0	13,400
2 cm X 1 mm	10-25	0	0	1.5	1,494	0	0	0	0
	25-40	2,548	42	0	0	0	2	0	2,100
	> 40	15,167	99	2.2	2,880	0	34	0	51,800
Sub-Totals:	1-10	46,544	15,662						
	10-25	9,498	1,522						
	25-40	2,548	42						
	> 40	15,167	99						
Total		73,757	17,325						

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

Period 8-1-55 to 8-31-55

	This Month	Last Month	Year to Date	Total Last Year
Water through settling basin, gal	17,800,000	15,900,000	130,600,000	158,200,000
Activity through settling basin, curies	12.7	8.7	129.9	237.3
Water through retention pond, gal	620,000	660,000	5,490,000	6,090,000
Activity through retention pond, curies	4.0	0.6	15.1	17.2
Waste to lagoons, gal	150,000*	110,000	1,194,000	997,000
Activity to lagoons, curies	841	1,941	16,947	7,224
Total activity in lagoons 2 and 3, curies	32,840	31,999	32,840	15,893
Demineralized water produced, gal	395,000	367,620	3,018,960	4,416,250
Liquid hydrogen produced, liters	17	12	80.1	135
Shift services for research division, man-hours	396	400	3,040	
Equipment decontamination services, man-hours	270	290	2,156	
Activation analyses completed	1	2	30	31
SF and special material receipts, number of lots	43	25	286	338
SF and special material shipped, number of lots	50	32	357	480
Number of research issuances **	0	1	19	62
Materials requests issued	12	14	98	196
SF and special materials reports issued	9	9	68	95
Internal audits and surveys	8	8	106	97

*Not included in this figure is 1700 gallons of non-radioactive chemical waste which was transferred to Lagoon No. 1. Lagoon No. 1 is the 170,000-gallon experimental pit that was originally used for radioactive waste but was abandoned in 1951 in favor of the large pits in a different location.

Extensive replacement of leaking water pipes under the stack pad has been started. The pipes, only about seven years old, have been found seriously corroded as a result of electrolytic action. The replacement pipes are being covered with bitumastic and wrapped in tar paper. If possible, galvanic protection will also be provided for the system.

**Discontinued.

WATER DEMINERALIZATION

The water demineralization plant operated fairly satisfactorily during August except that the No. 2 anion unit gave only about 20,000 gallons per regeneration, about half the capacity of the No. 1 unit. The reason for this has not been determined, but may be due to leakage past the multiport valve.

When the ORR begins operation, more water will be required than is now available. Proposals from several suppliers have been received for equipment necessary to increase the capacity of the plant to about 100 gpm of demineralized water. Most of the proposals were for larger anion tanks and a degasifier to remove carbon dioxide, thus increasing the capacity of the anion columns. Further information regarding the proposals is being obtained.

HYDROGEN LIQUEFACTION

The hydrogen liquefier operated satisfactorily during August. Seventeen liters of liquid hydrogen was produced.