UNCLASSIFIED **OAK RIDGE NATIONAL LABORATORY**

Operated By

UNION CARBIDE NUCLEAR COMPANY

POST OFFICE BOX P
OAK RIDGE, TENNESSEEEXTERNAL DISTRIBUTION
AUTHORIZED**ORNL**
CENTRAL FILES NUMBER

57-11-145

DATE: November 15, 1957

SUBJECT: PAR Loop Schedule

TO: W. F. Schaffer, Jr.

FROM: B. B. Klima

COPY NO. 48

DISTRIBUTION

1. W. F. Schaffer, Jr.	24. R. B. Lindauer
2. T. A. Arehart	25. C. S. Lissner
3. G. B. Berry	26. R. A. Lorenz
4. R. E. Blanco	27. H. M. McLeod
5. J. C. Bresee	28. D. M. Shepherd
6. R. B. Briggs	29. T. L. Trent
7. K. B. Brown	30. W. E. Unger
8. F. R. Bruce	31. C. E. Winters
9. D. W. Cardwell	32. F. W. Wuest
10. J. A. Cox	33-34. B. B. Klima
11. T. E. Cole	35. Laboratory Records - RC
12. G. A. Cristy	36-37. Laboratory Records
13. F. L. Culler	38. HRT Director's Office,
14. H. G. Duggan	9204-1, Y-12
15. W. K. Eister	39. M. J. Skinner
16. D. E. Ferguson	40. F. C. Moesel, AEC, Washington
17. R. M. Fuller	41-47. Westinghouse PAR Project
18. H. E. Goeller	48-62. TISE - AEC
19. A. T. Gresky	
20. K. E. Jamison	
21. L. J. King	
22. H. J. Klaus	
23. P. Kofmehl	

NOTICE

This document contains information of a preliminary nature and was prepared primarily for internal use at the Oak Ridge National Laboratory. It is subject to revision or correction and therefore does not represent a final report.

UNCLASSIFIED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

- A. Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission to the extent that such employee or contractor prepares, handles or distributes, or provides access to, any information pursuant to his employment or contract with the Commission.

To: W. F. Schaffer, Jr.
From: B. B. Klima
Date: November 15, 1957
Subject: PAR Loop Schedule

Purpose:

The purpose of this memorandum is to present the schedule for the design, procurement, fabrication and installation of the PAR loop experiment in the ORR, and to review the design characteristics and status of the equipment required for the installation and operation of the experiment.

This schedule will be brought up to date and re-issued semi-monthly to record the progress of the job.

Description of PAR Experiments:

The PAR loop experiment consists of an in-pile test assembly, which comprises a primary slurry loop, and the out-of-pile auxiliary systems required for proper operation of the primary loop. The primary loop, which is located entirely within the reactor beam hole, consists of a pump, heat exchanger, pressurizer-condenser, corrosion specimen holders and connecting piping. The auxiliary systems, cooling, off-gas, sampling, slurry dump, etc., are located outside of the beam hole largely within shielded equipment chambers adjacent to the experiment.

Basis for Schedule:

A firm schedule is necessary to coordinate the efforts of the various organizations cooperating in the design and installation of this experiment. To mention only those agencies primarily concerned, Westinghouse is building the PAR test loop and auxiliaries, and ORNL is installing and testing the loop and components.

The following programs must fit into the schedule for the design, procurement, fabrication, and installation of the PAR loop experiment.

Installation and Testing Program PAR

The following overall program has been established for the installation and testing of the PAR experiment:

Item No.	Item	Dates	
		Starting	Completion
1	Installation of equipment being furnished by Westing- house	Feb. 3, 1958	April 25, 1958

Item (cont'd) No.	Item	Dates	
		Starting	Completion
2	Preoperational testing	April 28, 1958	May 16, 1958
3	Water runs in loop out of ORR but connected to equipment installed at ORR	May 19, 1958	May 23, 1958
4	Installation of loop in ORR	May 26, 1958	May 30, 1958

Testing Program of ORR:

It is our understanding that the following dates apply for the testing of the ORR.

Item	Dates	
	Starting	Completion
Hydrostatic testing	Nov. 4, 1957	Dec. 9, 1957
Critical experiments	Dec. 9, 1957	During Jan., 1958
High power testing	Feb. 1, 1958	Feb. 28, 1958

Westinghouse Program

A summary of the schedule established at Westinghouse for design and procurement of the components they are to furnish is given in items 118 through 124.

Scope

The following schedule is broken down into such individual design or constructional units as seems logical so that the progress of these units can be followed. A description of each of the individual items is given so as to fully outline the scope of each job as well as giving the current status of each item.

The overall plan for arrangement of the equipment for the PAR loop installation at the ORR is shown in Figures 1 through 4.

The brackets on the schedule indicate the calendar period at which a phase is to be completed. An asterisk by a phase designation indicates that that phase is completed.

1. South Facility Plug

The south facility of the ORR is designed to accommodate a variety of large engineering experiments. The facility has a removable, aluminum encased, biological shield plug approximately 5 feet in diameter. Water

cooled aluminum pellets plus a boral shield fill the reactor end and act as a thermal shield and the remainder of the plug is filled with barytes concrete. Thermocouples are provided for recording the temperatures within the concrete portion of the plug. The plug has been designed for two experiments: the HS-1 hole (27" dia) for the PAR experiment and a smaller hole, HS-2 (10" dia).

The south facility plug is presently being manufactured at Paducah. The aluminum pellets and concrete shielding will be installed at ORNL before insertion in the reactor.

Drawings: D-29865 through D-29875, D-29877 through D-29879, D-29904 and D-29905.

2. Liner HS-1

The HS-1 beam hole of the south facility plug has a liner. This liner must be inserted before the south facility plug can be filled with water. The liner is being manufactured at Y-12.

Drawing: D-29885

3. Dummy Plug HS-1

The dummy plug for HS-1 is designed in two pieces, consisting of a large 27 inch diameter donut shaped section in the rear and a ten inch central section which extends through the large piece and the full length of the hole. The donut section is filled with barytes concrete. The plug section contains composite shielding, lead, boral, barytes concrete, stainless steel, and H₂O. The two sections are assembled and then inserted after the HS-1 liner is in place. A cooling water line must be installed to this plug. The dummy plug is being manufactured at Y-12. The barytes concrete will be added to the outer plug at ORNL.

Drawing D-29886 through D-29888.

4. HS-2 Extension

The extension is a pipe section to be bolted to the south facility plug to extend the HS-2 beam hole. The extension is being manufactured at Y-12:

Drawing D-29902.

5. HS-2 Plug

This plug is made in sections and each section is to be filled with barytes concrete. The HS-2 plug must be inserted in the south facility plug before it can be filled with water. Cooling water must be piped to this plug. This plug is being manufactured at Y-12. The Barytes concrete will be added to the plug sections at ORNL.

Drawings: 29903, 30206 through 30209.

6. Temporary Shielding

During the test period of the ORR, temporary shielding consisting of standard barytes block must be installed. This will surround the south facility plug and its appurtenances. This shielding must be in place before the reactor can be tested. It must be removed after the test so construction can resume.

7. Process Piping Preliminary

The process piping to the equipment chambers and appurtenances should be installed prior to installation of the rear shielding. This piping should be carried at this time as far as the equipment chamber stub-offs and to the west end of the shielding.

8. Rear Shielding

Two feet of barytes concrete block shielding is to be added against the reactor tank wall. This block should be against the wall prior to test of the reactor.

9. Sleeves

Holes must be cut in the floor and sleeves installed to connect chambers A and D and for piping to the basement panel. These should be completed prior to testing of the reactor so that the sleeves will be ready for piping immediately after the test period.

10. Equipment Chamber B

Equipment Chamber B is a reinforced mild steel box approximately 4 ft deep by 5 feet high by 5 feet wide with flanged cover. Into the chamber is fitted a packaged unit to be supplied by Westinghouse which will contain primarily a gas holdup tank to permit decay of radiolytic gases before discharge to the off-gas stack.

Equipment Chamber B is interconnected by ducts to equipment Chambers A and C.

The chamber must be installed and the utilities brought into the box. The packaged unit received from Westinghouse is inserted into the prepared chamber. Piping is then connected and finally the cover is put on.

11. Shielding Equipment Chamber B

The shielding for the top of equipment Chamber B is stacked lead brick and can be added after equipment Chamber B is installed and the utilities are connected to the chamber.

12. Equipment Chamber C

Equipment Chamber C is a reinforced mild steel box approximately 4 ft deep by 5 ft high and 6 ft wide with flanged cover similar to Chamber B.

Into the chamber is fitted a packaged unit to be supplied by Westinghouse, which will contain primarily the high pressure cooling water pumps, pressurizer, heat exchangers, and blowers.

Equipment Chamber C is interconnected by ducts to equipment Chamber B. The chamber must be installed and the utilities brought into the box. The packaged unit received from Westinghouse is inserted into the prepared chamber. Piping is then connected and the cover is put on.

Drawing: E-29924 and E-29925, D-29926.

13. Shielding Top-sides Equipment Chamber C

Shielding consisting of stacked lead brick is added to the top of C, west end of C, and east between B and C. This shielding can be added immediately after Chamber C has been placed and the utilities and piping have been brought into the box.

14. Equipment Chamber D

Equipment Chamber D is a reinforced mild steel box approximately 4 ft deep by 8 ft high by 5 ft wide with flanged cover similar to Chamber B. Into this chamber is fitted a packaged unit to be supplied by Westinghouse which will contain primarily a slurry dump tank, rinse dump tank, heat exchanger, and provisions for removal of slurry to a dump transport tank.

Equipment Chamber D is interconnected by duct to equipment chamber A. The equipment chamber is installed and the service and connecting piping stubbed in. The packaged unit is then added and the piping tied in. Finally, the cover plate is added.

15. Shielding Top and Sides Equipment Chamber D

The equipment Chamber D is shielded with lead brick on the top and sides. This may be added as soon as the box is installed and the service and other piping is brought into the chamber.

16. Equipment Chamber E

Equipment Chamber E is a reinforced mild steel box with flanged cover which is installed on top of Chamber B. Into this chamber is fitted two vacuum pumps which are supplied by Westinghouse.

Equipment Chamber E is not interconnected by ducts with the other equipment chambers.

The equipment chamber is first installed and utilities piped in and stubbed off. Then the packaged unit is added and the piping is connected. Finally, the cover plate is added.

17. Shielding Top and Side of Chamber E

Shielding in the form of lead brick is installed around Chamber E. This may be installed as soon as the box is installed.

18. Equipment Chamber A

Equipment Chamber A is a pressure tight stainless steel box approximately 5 feet square by 1 foot deep. It is mounted directly on the back of the HS-1 liner and contains valves and disconnects for inserting the experiment and connecting the experiment to the auxiliary equipment. It is closed by a cover through which pass valve extensions and a slurry sampler. Other valve extensions pass through the plate of the chamber. Special holders are necessary to place or remove cover.

This chamber is connected by ducts to the equipment Chambers B and D.

19. Floor in Pit

The floor in front of the south facility plug must be brought up to floor level with concrete block grouted in at the top.

20. Shield Front of Chamber B

The shield in the front of Chamber B is stacked lead brick and fabricated pieces. It has valve extension handles through the shield.

21. Shield Front of Chamber C

The shield in front of Chamber C is stacked lead brick and fabricated pieces. It has valve extension handles through the shield.

22. Shield Front of Chamber D

The shield in front of Chamber D is stacked lead brick and fabricated pieces. It has valve extension handles through the shield.

23. Shield Front of Chamber E

The shield in the front of Chamber E is stacked lead brick and fabricated pieces. It has valve extension handles through the shield, as well as oil changing provisions.

24. Shield Around Slurry Lines

The slurry lines running from the loop to equipment Chamber D is shielded with lead. There is a small removable piece inside of equipment Chamber A to shield the disconnects.

25. Concrete Shield East Chamber B

A concrete shield is built up from blocks to the east of Chamber B and west of the concrete in front of Chamber A.

26. Concrete Frame Shield

The concrete shield in front of the equipment Chamber A is a precast form with steel framework. It supports the lead shutter and the concrete door. It

contains valve extensions. It also forms a seat for the loop carrier.

27. Concrete Door

The present concrete door shields Chamber A. It is removable and contains valve extensions.

28. Lead Shutter

The lead shutter fits behind the concrete door and is to be used to shield the open beam hole after removal of the loop and prior to insertion of the dummy plug or another loop.

29. Concrete Block East of Chamber A

The shield running from the concrete frame to the reactor wall is built up from concrete block.

30. Shield Above Chamber A

A concrete shield is installed above Chamber A and below the balcony.

31. Lead Donut Shield Chamber A

A lead donut shield is installed around the HS-1 liner back of Chamber A.

32. Booster Pumps

Booster pumps are to be installed on the process water lines west of Chamber C.

33. Caustic System

Caustic is needed to wash out the gas holdup tank to dissolve solids and to reduce contamination. This caustic will be sprayed into the gas holdup tank from a small storage tank. The tank will be filled using batches of caustic prepared in the laboratory. No pumps or other auxiliaries are planned for the initial installation.

34. Slurry Charging System

At the present time the slurry charging system design has not been fixed. However, as presently visualized, it will consist of a heated stirred metal tank. This tank will probably need to be in a dry box to eliminate contamination of the area with thorium. Westinghouse is to furnish components for the slurry charging system.

35. Slurry Sampling System

The slurry will be sampled using special removable sample valves which are now under development. The sample will be transported in a movable shielded carrier.

36. Gas Sampling System

As presently contemplated the same type sample valve will be used for taking gas samples as for taking slurry samples. The samples will be transported in the same movable shielded carrier as used for slurry samples.

37. Slurry Removal Carrier

After completion of an experiment the slurry will be drained to Chamber D. It is then disposed of in a shielded carrier which will have a battery operated stirrer and provisions for cooling. Components of this carrier will be furnished by Westinghouse. The shield and dolly will be provided by ORNL.

38. Loop Carrier

This is a three-sectioned carrier for removal of the hot loop and transporting it to the Segmenting Facility. It will also be used to load the dummy plugs and loops into the reactor. Certain frames and jigs are needed for positioning the carrier in front of Chamber A.

39. Storage Igloo

The segmenting facility will be delayed approximately two months, therefore a shielded igloo is needed for interim storage of irradiated loops. This facility can also be used to house the HS-1 dummy plug when it is out of the reactor. The location of this facility is not fixed at this time.

40. Utility Instrument Panel

A two-section instrument panel is installed west of equipment Chamber C for the utilities control.

41. Utilities Instruments

Operational and control instruments will be installed in the utilities lines during and after these lines are installed. The bulk of the instruments will be furnished by Westinghouse.

42. Process Instrument Panel

A three-section instrument panel is installed south of Chamber C for the control of the loop. These panels will be designed and built by ORNL.

43. Process Instruments

Instruments will be installed in the equipment chamber frames which are to be furnished by Westinghouse. They will need to be connected on receipt at ORNL.

44. Basement Process Instrument Panel

An instrument panel is installed in the basement for control of the equipment in Chamber D. It will be designed and built by ORNL.

45. Basement Process Instruments

Instruments will be installed in the process lines in and around Chamber D during and after installation of the piping. These will be furnished by Westinghouse.

46. Radiation Instrument Panel

A two-section instrument panel is installed west of the process instrument panel to record and indicate the state of radiation in and around the operating area. These will be designed and built by ORNL.

47. Radiation Instruments

Instruments will be installed in and around the process area during and after installation of the piping and the equipment. These will be designed and built by ORNL.

48. Electrical Panel

This panel, which is to be furnished by Westinghouse, is for control of the power to the unit.

49. Emergency Power

Emergency power was deemed necessary for the twenty seconds after a power outage. This is no longer deemed to be necessary.

50. Metering Pump and Auxiliaries

The Milton Roy pump which is to test the disconnects and for other miscellaneous duties is to be installed west and adjacent to equipment Chamber C. A feed and metering vessel and connecting piping and valves are required.

51. Low Boy Trailer

A Low Boy trailer with a special frame will be used to move the loop carrier from the reactor to the segmenting facility and/or to the storage igloo. The special frame is to be designed and built by ORNL.

60. In-Pile Loops and Vapor Containers

The first loop will be furnished by Westinghouse. Responsibilities on subsequent loops will be firmed at a later date.

68. Loop End Jigs and Fixtures

These jigs and fixtures are needed to locate the valves and disconnects on the back of the loop. Two sets have been made; one set will be shipped to Westinghouse and the other retained at ORNL. These were made in the shops at ORNL.

Drawings : D-29977 through D-29979.

69. Loop Handling Tool

This tool is for removal and insertion of the loop into the carrier and from the carrier to the beam hole HS-1. It will also serve the same function for the dummy plug. Development models will be tested on the mockup. The first model is being made in the machine shop at ORNL.

Drawing: D-26416.

70. Disconnect Handling Tool

This tool is a remote clamp to hold the disconnects during installation and removal. Development models will be tested on the mockup. The first model will be built at ORNL.

71. Disconnect Nut Jammer

This tool was to apply pressure to keep the nut from turning while the disconnects are being ratcheted. No further action will be taken until it is proven to be necessary on the mockup.

72. Disconnect Wrench

These are tubing ratchet wrenches used with a long handle and a torque wrench to be used to tighten and loosen the disconnects. They were purchased and are now on hand awaiting tests on the mockup.

73. Loop Wheel Gauge

This jig is to be used to set the distance which the wheels on the loop can protrude from the loop. Two jigs will be made, one for the use of Westinghouse and one for use by ORNL personnel. This jig is being made in the shop at ORNL.

Drawing: Field sketch only.

74. 27-inch Trough

A 27-inch trough will be made to serve the dual purpose of loading the dummy plugs and loops into the carrier and reactor and as part of the storage igloo.

75. 10-inch Trough

A 10-inch trough will be made to load the small dummy plug (HS-2) into the reactor.

93. Mockup Loop HS-1

A mockup of the loop and the reactor hole liner for HS-1 was made to test the loop handling characteristics. It is presently installed in the basement of Building 4501.

Drawings: E-27075 through 27077.

94. Mockup Disconnects

A mockup of the loop disconnects and equipment Chamber A was made and installed on the back of the loop HS-1 mockup to train operators and test disconnects and tools.

Drawing: E-26413 through 26415

95. Slurry Valve No. 3

A development model of the in-pile slurry sampling valve was made in the ORNL shops and is under test.

96. Ultrasonic Slurry Sampler

The device made to test applicability of ultrasonic to slurry sampling. The sampler was made in ORNL shops and is under test.

97. Gold Seal Disconnect

A gold seal ring is planned in conjunction with the autoclave type fittings as additional insurance against inadvertent leakage at the various disconnect joints at the aft end of the vapor container. One unit is to be built for test on the mockup.

118 through 124

To be furnished by Westinghouse as the PAR loop and auxiliaries. These items have been taken directly from the Westinghouse schedule and are included for information only.

118. Main Loop

The main loop is a hermetically sealed unit which consists essentially of a pump, pressurizer, heat exchanger, corrosion specimen and holders, and the shell or vapor container. The unit will be essentially constructed in three pieces. The pressurizer and other loop components will be built separately. These units will then be assembled to the backplate and shielding and tested. This combined assembly will be encased in the vapor container after testing.

119. Equipment Chamber B

This packaged unit is primarily a frame containing valves, piping, and a gas holdup tank. It will be tested prior to being shipped to ORNL.

120. Equipment Chamber C

This packaged unit is primarily a frame containing valves, piping, heat exchangers and blowers. It will be tested with the other units prior to shipment to ORNL.

122. Electrical Panel Board

This panelboard will control the regular and emergency power requirement for the installation. It will be shipped after testing.

123. Test Loop, Chamber B, C, and D

The assembled parts of the equipment chambers, panels, and loop will be tested and when found to be satisfactory the vapor container will be assembled on the loop. The assembly will be further tested prior to shipment to ORNL.

124. Valves

The autoclave valves, are to be inspected by ORNL personnel prior to use by Westinghouse in the equipment chamber assemblies.

BBK/nh

B. B. Klima
Process Design Section
Chemical Technology Division

FIGURE 1

FIGURE 2

ELEVATION OF EQUIPMENT
OPERATING FLOOR.
Scale: $\frac{1}{4}$ " = 1'-0"

PLAN

PAR LOOP EQUIPMENT IN ORR BASEMENT.

Scale: 1/2"=1'-0"

FIGURE 3

ORNL-IR-DWG-24113
UNCLASSIFIED

ELEVATION OF EQUIPMENT CHAMBER "D"
Scale: 1/2" = 1'-0"

FIGURE 4

PAR GROUP

LOOP AUXILIARIES

-13-

11/15/57

*Asterisk indicates completion of phase.

ITEM NO.	ITEM	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	REMARKS
1.	South Facility Plug	Des. *	Fab.		Inst.						Being made at Paducah
2.	Liner HS-1	Des. *	Fab.		Inst.						Being made at Y-12
3.	Dummy Plug HS-1	Des. *	Fab.		Inst.						Being made at Y-12
4.	HS-2 Extension	Des. *	Fab.		Inst.						Being made at Y-12
5.	HS-2 Plug	Des. *	Fab.		Inst.						Being made at Y-12
6.	Temporary Shielding		Des. Fab.	Inst.			Removal				
7.	Process Piping Preliminary		Des. Inst.								
8.	Rear Shielding		Des. Fab.	Inst.							
9.	Sleeves		Des. Fab.	Inst.							
10A	Equipment Chamber B		Des. Fab.	Inst.							
10B	Backaged Unit B				Recd.	Inst.					Westinghouse to Furnish
10C	Cover Plate B		Des. Fab.			Inst.					
11	Shielding Top Equip. Ch. B		Des. Fab.	Inst.							
12A	Equipment Chamber C	Des.		Fab.	Inst.						Construction Bids Requested
12B	Packaged Unit C					Recd.	Inst.				Westinghouse to furnish
12C	Cover Plate C	Des.		Fab.			Inst.				Construction bids requested
13	Shielding Top-Sides of Ch. C		Des. Fab.	Inst.							
14A	Equipment Chamber D		Des. Fab.	Inst.							
14B	Packaged Unit D				Recd.	Inst.					Westinghouse to Furnish
14C	Cover Plate D		Des. Fab.			Inst.					
15	Shielding Top Sides of Ch. D		Des. Fab.	Inst.							
16 A	Equipment Chamber E		Des. Fab.	Inst.							
16B	Packaged Unit E			Recd.	Inst.						Westinghouse furnishing Components
16C	Cover Plate E		Des. Fab.			Inst.					
17	Shielding Top-Sides of Ch. E		Des. Fab.	Inst.							

PAR GROUP

LOOP AUXILIARIES

-19-

*Asterisk indicates completion of phase

Nov. 15, 1957

ITEM NO.	ITEM	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	REMARKS
18	Equipment Chamber A		Des.			Fab.	Inst.				
19	Floor in Pit			Des.			Fab.	Inst.			
20	Shield Front Chamber B			Des.		Fab.		Inst.			
21	Shield Front Chamber C			Des.		Fab.		Inst.			
22	Shield Front Chamber D			Des.		Fab.		Inst.			
23	Shield Front Chamber E			Des.		Fab.		Inst.			
24	Shield Slurry Lines			Des.		Fab.		Inst.			
25	Concrete Shield East Ch. B					Des.		Fab.	Inst.		
26	Concrete Frame Shield					Des.		Fab.	Inst.		
27	Concrete Door					Des.		Fab.	Inst.		
28	Lead Shutter					Des.		Fab.	Inst.		
29	Concrete Shield E. Ch. A					Des.		Fab.	Inst.		
30	Shield above Ch. A					Des.	Fab.	Inst.			
31	Lead Donut Chamber A			Des.		Fab.		Inst.			
32	Booster Pumps					Des.	Inst.				
33	Caustic System				Des.		Fab.	Inst.			
34	Slurry Charging System				Des.	Rec.	Fab.	Inst.			Westinghouse to furnish components
35	Slurry Sampling System				Des.		Fab.				
36	Gas Sampling System				Des.		Fab.				
37	Slurry Removal Carrier				Des.	Rec.	Rec.	Fab.			Westinghouse to furnish components
38	Loop Carrier			Des.		Fab.					
39	Storage Igloo				Des.				Fab.	Inst.	
40	Utilities Instrument Panel			Des.		Fab.		Inst.			
41	Utilities Instrument				Rec.		Inst.				Westinghouse to furnish components
42	Process Instrument Panel							Inst.			

PAR GROUP Loop Auxiliaries and Loop

*Asterisk indicated completion of phase

11/15/57

[illegible]

PAR GROUP Tools, Jigs, and Fixtures

*Asterisk indicates completion of phase

11/15/57

[illegible]

PAR GROUP

Westinghouse Program

-3-

*Asterisk indicates completion of the phase.

11/15/57

ITEM NO.	ITEM	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	REMARKS
118	Main Loop				Fab.	Test	Ship Retest				
	Pressurizer	* Des		Fab.							Fabrication by Artisan
	Main Loop	* Des		Fab.							Fabrication by Grinnell
	Assembly Loop and Press.				Fab.						
	Vapor Container	Des.			Fab.		Inst.				
	Back Plate and Shield	Des.			Fab.						
119	Equipment Chamber B			Fab.	Test	Ship					Fabrication at Model Shop
	Gas Holdup tank	Procurement									Excluding Spray Nozzles
	Frame	Fab.									
	Valves, piping	Procurement		Fab.							Procurement complete except for check valves
120	Equipment Chamber C			Fab.		Test	Ship				Fabrication at Model Shop
	Pressure Vessels	Procurement									
	Heat Exchanger Blowers	Procurement									
	Frame	Fabrication									
	Piping, Valves	Procurement	Fabrication								
121	Equipment Chamber D			Fab.	Test	Ship					Fabrication at Model Shop
	Pressure Vessels		Procurement								
	Frame		Fab.								
	Piping, Valves	Procurement		Fab.							Procurement complete except for check valves
122	Electrical Panel Board			Proc.	Fab.						
123	Test Loop, Chamber B, C & D					Test					
124	Valves			Fab.	Insp.						Inspection by ORNL

-24-

PROCUREMENT SUMMARY

PAR GROUP

ITEM No.	ITEM	PURCHASE REQUEST	PURCHASE REQUISITION	PURCHASE ORDER	PROMISED DELIVERY	COST	RECEIVED	REMARKS
1	PAR Loop Mockup	8/21/57	D-131642 8/21/57	96X-79975 9/3/57	9/16/57	\$2,164.00	10/2/57	Excess material returned 10/14/57
2	Bearings for Mockup	8/21/57	D-131643 8/21/57	L.R. X-34 8/21/57	8/30/57	\$17.40	9/11/57	Partial Shipment 9/3/57
3	Bearings for Dummy Plugs	9/5/57	D-131646 9/5/57	L.R. X-43 9/10/57	10/4/57	\$34.80	9/12/57	
4	Ratchet Wrenches for Disconnects	9/13/57	D-131652 9/19/57	S-72757 10/9/57	10/21/57	\$25.67	10/23/57	
5	5 ft. Handle for Ratchet Wrenches for Disconnects	9/13/57	D-131653 9/19/57	22X86802 9/26/57	10/4/57	\$6.70	10/4/57	
6	Torque Wrench for Disconnect	9/16/57			10/25/57		9/20/57	From Stores
7	Republic Valves for Disconnect Mockup	9/17/57	D-131654 9/20/57	S-81501-22 9/26/57	9/25/57	\$131.64	10/1/57	
8	Emeto Fittings for Disconnect Mockup	9/16/57	D-131655 9/23/57	44X86257 10/1/57	11/18/57	\$415.35	11/8/57	Partial Shipment 10/15/57
9	Tubing for Disconnects for Disconnect Mockup	9/16/57	D-131657 9/23/57	44X-86247 9/26/57	10/10/57	\$178.19	11/7/57	
10	Autoclave Valves and Fittings for Disconnect Mockup	9/16/57	D-131660 9/23/57	41X-86429 9/27/57	10/3/57	\$577.42	11/1/57	
11	Bar 1-1/2" x 5" for Equipment Chambers B, C, D and E	9/24/57	D-131661 9/26/57	44X-87669 10/10/57	10/15/57	\$1,946.60	10/16/57	
12	Lead for Shielding 1st Lot	10/17/57	D-131664 10/17/57					
13	Valve Couplers for Dummy Plug HS-1	10/31/57	D-160211 10/31/57	41X-89417 11/4/57	11/11/57	\$101.46	11/14/57	
14	Circuit Breaker	11/1/57		53X-89869 11/8/57	11/18/57		11/18/57	
15	Transformer	11/1/57		53X-90729 11/11/57	11/28/57			
16	Stainless steel for Equipment Chamber A	11/4/57	D-131665 11/5/57		12/9/57			
17	Structural Steel For Shielding	11/6/57	D-131667 11/11/57	42X-90095 11/14/57	12/6/57	\$310.38		

-5-

PAR GROUP

[illegible]