

BROOKHAVEN NATIONAL LABORATORY NATIONAL SYNCHROTRON LIGHT SOURCE	Number: LS-SDL-0012	Revision: B
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Subject: SDL Process Pumps Start-up/Shut-down		
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SDL Process Pumps

Start-up/Shut-down

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1.0 Scope

Procedure to start-up and shut-down pumps for the Accelerator Components (A.C.) and Power Supplies (P.S.) systems within the Source Development Laboratory (SDL), building 729.

2.0 Individual Systems

There are two independent process cooling systems located within building 729:

- Accelerator Components System
- Power Supplies System

For both systems, all relevant equipment is located within either the mechanical equipment room (MER 729A) or on the experimental floor.

3.0 Major Equipment

3.1 Pump

Each system has a pump that supplies system pressure and flow. Located inside MER 729A.

3.2 Pressure Control Valve and Controller

Each system has a control valve that acts to maintain a constant supply pressure. The control valve is located on the discharge side of the pump, and the controller is located on the experimental floor, near the SDL control center.

3.3 (Manual) Throttle Valve

Each system has a manual throttle valve used in the start-up process. Located on discharge side of pump.

3.4 Motor Starter and Safety Disconnect

Each pump has a safety disconnect located next to it, and a motor starter for starting and stopping the specific pump. This starter is located on the experimental floor, near the SDL control center.

3.5 Over Current Device (Circuit Breaker)

Each pump has a 40 Amp breaker located in the service panel next to the motor starters.

3.6 75 Kw Heater

The Accelerator Components System has a 75 Kw heater interlocked to the A.C.'s pump "on" signal.

3.7 Alarms

3.7.1 Pump on/off Alarm and Low Suction Pressure Alarm

Located on Process panel on experimental floor, near SDL control center.

3.7.2 Pressure Controller

Indication that system pressure is outside the system's operational bandwidth.

Associated with pressure controller, not an alarm in the true sense.

3.7.3 Heater Disabled Alarm

For Accelerator Components System only. Located on process panel on experimental floor, near SDL control center. Indicates that 75 Kw heater has been disabled.

4.0 System Start-up

This sequence of steps is for each system.

4.1 System is "off" – suction pressure: 15-20 psig.

4.2 For Accelerator Components System only. Ensure that the 75Kw heater on/off switch is in the "on" position. The overtemperature controller should be operational and the temperature controller is "off". Both controllers will be operational during pump operations.

Check: Ensure that the heater disabled alarm switch is in the "normal" position.

If the overtemperature controller is not operational, with the switch in the "on" position, then contact the NSLS Utilities Group before proceeding.

- 4.3 Check pressure controller. Controller should be in "Auto" position and control valve should be 100% open. If either one of these is not correct, contact the NSLS Utilities Group before proceeding.
- 4.4 Place manual throttle valve to almost "closed" position. Pump will be started in the (near) "deadheaded" condition.
- 4.5 Place safety disconnect switch in the "on" position.
- 4.6 Place motor starter disconnect switch to the "on" position.

"Green" light on the motor starter is now lit.

Note: "Green" light signifies pump "off".
"Red" light signifies pump "on".

Check: If "Green" light is "out", check specific circuit breaker. Place in "on" position. If needed, replace bulb.

- 4.7 Press the "Start" button on the motor starter.

Pump will start. "Red" light on motor starter will light.

- 4.8 Slowly open the (manual) throttle valve.

Do not leave pump "running" in the "deadheaded" condition (i.e.: throttle valve "closed") for any significant length of time.

Note: As this valve opens, the pressure control valve will begin to "take over" control and the control valve will begin closing.

Reference:

Accelerator Components:

Pressure set point = 62 psig

Power supplier:

Pressure set point = 61.5 psig

Continue opening throttle valve to full (100%) open position.

Note: For the Accelerator Components System only.

Check: The temperature controller should now be operational. Both the overtemperature and the temperature controller should be operational. If either one is not operational, contact the NSLS Utilities Group before proceeding.

Heater Disabled Alarm

Once the pump is operational, the 75 Kw heater will experience an alarm if any one of the following events occur:

- The overtemperature controller shuts down; or
- The heater on/off switch is placed in the “off” position; or
- A thermal switch (Klixon) on the heater control box “opens”.

If this alarm occurs, place the alarm switch in “lockout” position and call the NSLS Utilities Group before proceeding.

- 4.9 Place “on/off” alarm switch into “normal” position. If required, place low suction pressure alarm switch into “normal” position and clear this specific alarm by pressing the “reset” button.

Monitor system, and once system is stabilized, then “release” system to SDL operators for operational use.

5.0 System Shut-Down

Except as noted, this sequence of steps is for each system.

Before shutting system off, notify SDL operators that system is coming off-line.

- 5.1 For Accelerator Components system only. Place the 75 KW heater on/off switch in the "off" position. Both the overtemperature controller and the temperature controller will be "off".

Note: The Heater Disabled Alarm should be active; to silence, place alarm switch in the "lockout" position.

- 5.2 System is "running". "Red" light on motor starter is lit.

- 5.3 Press the "stop" button on motor starter.

The pump will shut down. "Green" light on motor starter will light.

Note: Pressure control valve will go to full (100%) open position. Bar graph on controller will "flash", indicating the system's pressure is less than the allowable, minimum, operational value.

Pump "on/off" alarm will sound. Place "on/off" alarm switch into "lockout" position.

Note: It is possible, though unlikely, that the low suction pressure alarm will sound. If it does, place this switch into "lockout" position.

- 5.4 Place motor starter disconnect switch to the "off" position. "Green" light on motor starter will go out.

- 5.5 Place manual throttle valve to almost "closed" position.

Revision Log

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Revision Number	Date Approved	Pages Affected	Description of Revision
A	27 Jan 00	---	First issue
B	07 Feb 01	1 and 2	Was six (6) pages. Added cover sheet and table of contents
		7	New section 5.1; sections 5.2 – 5.5 were 5.1 – 5.4
		8	Removed “Table” from title.