

108050000-TD8018-R00

Spallation Neutron Source

Injection Dump Exhaust Controls Functional System Design (FSD)

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SPALLATION NEUTRON SOURCE

Argonne National Laboratory • Brookhaven National Laboratory • Lawrence Berkeley National Laboratory • Los Alamos National Laboratory • Oak Ridge National Laboratory

Ring Injection Dump Exhaust Controls Description TD8018 Rev 0

Operating Philosophy

Purpose:

- 1) Provide operator indication if airflow in the exhaust main ductwork or dump vault branch pipes falls below a user specified limit value.
- 2) Monitor the pre-filter and HEPA filters for dirty filter status.
- 3) Provide operator indication if negative pressure in the dump vault, service vault or dump tank falls below a user specified limit value for more than 20 seconds.

Assumptions:

- 1) No logic control is required except to provide alarms based on user supplied limit values.

Operator Controls and Operating Modes

- 1) Airflow Limit – An alarm will be generated if the airflow in the exhaust main ductwork or dump vault branch pipes drop below the Airflow Limit value.
- 2) Pressure Alarm Limit – An alarm will be generated if the pressure in the dump vault, service vault or dump tank falls below the Pressure Alarm Limit value.

OPERATOR INTERFACE DEFINITIONS

Local Hardware/Manual Operator Controls

- 1) HEPA filters differential pressure (*PDI2353D, PDI2353F, PDI2353K*)
- 2) Pre filters differential pressure (*PDI2353E, PDI2353G*)

Software HMI/EPICS Digital Operator Controls

- 1) None

Software HMI/EPICS Digital Displays

- 1) None

Software HMI/EPICS Analog Operator Controls

- 1) Pressure alarm level limit value (*XXP2353*)
- 2) Air flow alarm level limit value (*XXA2353*)

Software HMI/EPICS Analog Displays

- 1) Injection dump exhaust branch flow (*FT2353A, FT2353B*)
- 2) Injection dump main exhaust flow (*FT2353C*)
- 3) Pre filter and HEPA filter differential pressure (*PDT2353A*)
- 4) HEPA filter differential pressure (*PDT2353B*)

- 5) Pre filter differential pressure (*PDT2353C*)
- 6) Injection dump mechanical room / dump vault room differential pressure (*PDT2353H*)
- 7) Injection dump service vault / dump tank pit differential pressure (*PDT2353J*)
- 8) Injection dump mechanical room / service vault room differential pressure (*PDT2353L*)

Software HMI/EPICS Alarms (via EPICS Alarm Handler)

- 1) Low pressure alarm
- 2) Low airflow alarm

Control Logic Description

The injection dump mechanical room / dump vault room differential pressure, injection dump service vault / dump tank pit differential pressure, and injection dump mechanical room / service vault room differential pressure will be checked against the pressure alarm level value. If any of the pressures are lower than the pressure alarm level value, a low pressure alarm will be generated.

The injection dump exhaust branch flows, and injection dump main exhaust flow will be checked against the airflow alarm level value. If any of the flows are less than the airflow alarm level value, a low airflow alarm will be generated.

