ENCLOSURE 1

SHINE MEDICAL TECHNOLOGIES, LLC

SHINE MEDICAL TECHNOLOGIES, LLC APPLICATION FOR AN OPERATING LICENSE SUPPLEMENT NO. 8 AND RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

FINAL SAFETY ANALYSIS REPORT CHANGE SUMMARY

Summary Description of Changes	**FSAR Impacts**
Remove safety-related designation of the enable nonsafety switch, (i.e., the switch is not required to be a safety-related).	Section 7.4, Section 7.5, and Section 7.6
Update the enable nonsafety switch type (i.e., the switch has been changed from a three-position switch to a two-position switch).	Figure 7.4-1 (Sheets 12, 13, and 14), Figure 7.5-1 (Sheets 22 thru 27), and Section 7.6
Update the name of the "nitrogen purge system (N2PS) inerting gas isolation valve" to the "SCAS nitrogen purge isolation valve" to be consistent with internal design documents. Table 3.4.1-a, Table 3.4.2-a, Basis Section 3.4.1, and Basis Section 3.4.2 of the technical specifications have also been revised to change the name of the "nitrogen purge system (N2PS) inerting gas isolation valve" to "SCAS nitrogen purge isolation valve.”	Section 7.3, Section 7.4, and Figure 7.4-1 (Sheet 13)

Final Safety Analysis Report (FSAR) mark-ups related to the SHINE Medical Technologies, LLC (SHINE) responses to requests for additional information are provided as Attachment 1 to Enclosure 2 (non-public version) and Enclosure 3 (public version). FSAR mark-ups associated with the above FSAR changes are included with those mark-ups provided as Attachment 1 to Enclosure 2 and Enclosure 3. Conforming technical specification markups associated with the above FSAR changes are provided as Attachment 1 to this enclosure.

ENCLOSURE 1
ATTACHMENT 1

SHINE MEDICAL TECHNOLOGIES, LLC

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TECHNICAL SPECIFICATIONS MARKUPS

5 pages follow

Table 3.4.1-a Isolation Valves

	Component	Number Provided per Flow Path	Action
a.	TSV fill isolation valves	2	1
b.	TSV dump tank drain isolation valve	1	1
c.	VTS lower lift tank target solution valve	1	1
d.	TOGS gas supply isolation valves	2	1
e.	TOGS vacuum tank isolation valves	2	1
f.	~~N2PS inerting gas supply~~SCAS nitrogen purge isolation valves	2	2
g.	TOGS nitrogen vent isolation valves	2	2
h.	TOGS RPCS return isolation valve	1	2
i.	TOGS RPCS supply isolation valves	2	2
j.	RVZ1e IU cell exhaust (PCLS expansion tank) ventilation valves	2	2
k.	RVZ1r RPCS supply isolation valve	1	2
l.	RVZ1r RPCS return isolation valve	1	2
m.	PCLS supply isolation valve	1	2
n.	PCLS return isolation valves	2	2
o.	TPS target chamber supply isolation valves	2	1
p.	TPS deuterium supply isolation valves	2	1
q.	TPS target chamber exhaust isolation valves	2	1
r.	TPS neutron driver evacuation isolation valves	2	1
s.	NDAS target/ion source cooling supply isolation valve	1	1
t.	NDAS target/ion source cooling return isolation valve	1	1
u.	NDAS vacuum pump cooling supply isolation valve	1	1
v.	NDAS vacuum pump cooling return isolation valve	1	1

LCO 3.4.2	The Confinement check valves listed in Table 3.4.2-a shall be Operable. Note – This LCO is applied to each IU or TPS train independently; actions are only applicable to the IU(s) or TPS train(s) that fail to meet the LCO during the associated condition(s) of applicability.
Applicability	According to Table 3.4.2-a
Action	According to Table 3.4.2
SR 3.4.2	The check valves listed in Table 3.4.2-a shall be inspected annually.

Table 3.4.2 Confinement Check Valve Actions

	Action (per IU or per TPS train)	**Completion Time**
1.	If the check valve is inoperable, Place the associated IU in Mode 3 AND Place the associated IU in Mode 0.	 6 hours [ ]PROP/ECI
2.	If the check valve is inoperable, Place the associated IU in Mode 3 AND Close the PCLS supply isolation valve.	 6 hours 6 hours
3.	If the check valve is inoperable, Close the TPS isolation valve in the affected flow path.	 6 hours

Table 3.4.2-a Confinement Check Valves

	Component	**Applicability**	**Action**
a.	TOGS RPCS return check valve	Associated IU in Mode 1, 2, 3, or 4	1
b.	~~N2PS inerting gas supply~~SCAS nitrogen purge check valves (per parallel N2PS ~~inerting gas~~ supply flow path)	Associated IU in Mode 1, 2, 3, or 4	1
c.	PCLS supply check valve	Associated IU in Mode 1, 2, 3, or 4	2
d.	TPS helium supply check valve	Tritium in associated TPS process equipment not in storage	3

Basis 3.4.1 LCO

Primary Confinement and PSB isolation valves ensure Confinement of postulated radioactive material releases is provided. A number of process systems penetrate the primary Confinement boundary. Piping systems that penetrate the primary Confinement boundary capable of excessive leakage are equipped with one or more isolation valve(s) that serve as active Confinement or isolation components, except for the ~~N2PS inerting gas supply~~SCAS nitrogen purge and TOGS nitrogen vent to PVVS connections, which do not change state on an IU Cell Safety Actuation, and open on an IU Cell Nitrogen Purge to provide hydrogen gas mitigation. Actuation of the valves is controlled by TRPS. The primary Confinement boundary is further described in FSAR Subsection 6a2.2.1.1. The PSB is further described in FSAR Section 4a2.2.

LCO 3.4.1 addresses only the primary Confinement and PSB isolation valves actuated by the associated TRPS subsystem. The scope of this LCO begins at the outputs from the EIM(s) for the associated actuated components and extends through the actuated components.

When an isolation valve in a flow path is inoperable, the flow path may be isolated by closing at least one valve in the affected flow path within 6 hours if permitted by Tables 3.4.1 and 3.4.1-a, or the associated IU may be placed in Mode 3 within 6 hours and Mode 0 within [ ]PROP/ECI. The 6 hour completion time allows for investigation and the performance of minor repairs. If repairs are unable to restore the affected valves to Operable status, the completion time allows for the affected IU to be shut down or the affected processes to be halted in an orderly manner. For piping systems other than the NDAS cooling water lines, the action completion time is acceptable based on the continued availability of the redundant actuation valve (or redundant check valve) to perform the required function. The action completion time for inoperable NDAS cooling water isolation valves is acceptable based on the closed-loop design of the system and the low likelihood of a failure requiring the affected valve to isolate during the completion time. Transfer of target solution out of the IU to achieve Mode 0 requires the target solution to be held in the TSV dump tank for at least the minimum period of time specified in LCO 3.1.8 prior to transfer. Approximately [ ]PROP/ECI are required to complete the transfer of target solution to the RPF. One valve in a flow path is allowed to be temporarily inoperable for up to 2 hours for the performance of required surveillances.

Additional discussion for each component listed in Table 3.4.1-a is provided below:

a. TSV fill isolation valves isolate the PSB and are provided to prevent the introduction of target solution into the TSV outside of Mode 1 and to control the rate of TSV fill. The valves close on an IU Cell Safety Actuation and a Fill Stop. Two redundant valves, in series, are provided.

b. - c. The TSV dump tank drain isolation valve is provided to prevent inadvertent transfer of irradiated target solution or misdirected flow of liquids into the TSV dump tank. The valve isolates the PSB on an IU Cell Safety Actuation. Redundant isolation valves to the dump tank drain isolation valves are provided by the VTS lower lift tank target solution valves. A single VTS lower lift tank target solution valve is provided for IU cell 1 and for IU cell 8. Piping

downstream of the TSV dump tank drain isolation valve for IU cells 2 through 7 contains a branch; therefore, two parallel VTS lower lift tank target solution valves are provided for each of IU cells 2 through 7, one for each parallel branch.

d. - e. TOGS gas supply and vacuum tank isolation valves are provided to isolate the PSB and close on an IU Cell Safety Actuation. Two redundant valves, in series, are provided per flow path.

f. - g. ~~N2PS inerting gas~~SCAS nitrogen purge and TOGS nitrogen vent isolation valves provide a flow path for the N2PS to provide hydrogen mitigation for the IU on a loss of TOGS. The valves are opened on an IU Cell Nitrogen Purge. Two redundant valves, in parallel, are provided for each location. The ~~N2PS inerting gas~~SCAS nitrogen purge isolation valves are also each equipped with a check valve to protect against reverse flow out of the IU cell. The option to close at least one valve in the affected flow path in response to an inoperable valve is not provided as the ~~N2PS inerting gas~~SCAS nitrogen purge and TOGS nitrogen vent isolation valves are required to be opened on an IU Cell Nitrogen Purge.

h. - i. TOGS RPCS supply and return isolation valves provide isolation of the Confinement boundary and prevent flooding of the PSB in the event of a leak into TOGS. The valves are closed on an IU Cell Safety Actuation. Two redundant TOGS RPCS supply isolation valves, in series, are provided, but only one TOGS RPCS return isolation valve is provided. Redundant isolation (to prevent water intrusion into the PSB) is provided by the TOGS RPCS return line check valve (see LCO 3.4.2). The option to close at least one valve in the affected flow path in response to an inoperable valve is not provided because RPCS cooling of TOGS is required when the TOGS is Operating.

j. RVZ1e IU cell exhaust ventilation valves are provided in the exhaust flow path of the PCLS expansion tank. These valves isolate the primary Confinement boundary and are closed on an IU Cell Safety Actuation. Two redundant dampers, in series, are provided. The option to close at least one valve in the affected flow path in response to an inoperable valve is not provided because ventilation of the PCLS expansion tank is required when the IU is Operating.

k. - l. RVZ1r RPCS supply and return isolation valves are provided to isolate the primary Confinement boundary and close on an IU Cell Safety Actuation. One supply and one return valve are provided. Redundant isolation is not required because the RVZ1r cooling coil is not open to the primary Confinement atmosphere. The option to close at least one valve in the affected flow path in response to an inoperable valve is not provided because RPCS cooling of RVZ1r is required when the IU is Operating.

m. - n. PCLS isolation valves are provided on the cooling water supply and return lines to isolate the primary Confinement boundary and close on an IU Cell Safety Actuation. Redundant PCLS return isolation valves and a single PCLS supply isolation valve is provided for each IU. Redundant isolation for the PCLS supply is provided by the PCLS supply check valve (see LCO 3.4.2). The valves confine a leak of radioactive material into the PCLS to the primary

Confinement. The PCLS communicates with the primary Confinement atmosphere (via the PCLS expansion tank vent line). The option to close at least one valve in the affected flow path in response to an inoperable valve is not provided because PCLS cooling of the TSV is required when the IU is Operating.

o. - r. TPS valves are provided to isolate the primary Confinement boundary and close on an IU Cell Safety Actuation or on an IU Cell TPS Actuation. Two redundant valves, in series, are provided for each location.

s. - v. NDAS cooling water valves are provided to isolate the primary Confinement boundary and close on an IU Cell Safety Actuation. The NDAS cooling water lines are normally closed loops inside of the primary Confinement boundary. One valve is provided for each location.

SR

The closure testing ensures the continued operability of the valves and dampers. The surveillance frequency is consistent with the recommendations from ANSI/ANS 15.1-2007.

Basis 3.4.2 LCO

Check valves provide isolation functions as described below:

a. The TOGS RPCS return check valve, as described in FSAR Subsection 4a2.8.7, provides redundant isolation with the TOGS RPCS return isolation valve (see LCO 3.4.1, item h.), which allows TOGS to meet single failure criteria following the receipt of an isolation signal from TRPS.

With the check valve inoperable, the IU is required to be placed in Mode 3 within 6 hours and in Mode 0 within [ ]$^{PROP/ECI}$ in order to place the IU in a condition where the operation of TOGS is not required. Transfer of target solution out of the IU to achieve Mode 0 requires the target solution to be held in the TSV dump tank for at least the minimum period of time specified in LCO 3.1.8 prior to transfer. Approximately [ ]$^{PROP/ECI}$ are required to complete the transfer of target solution to the RPF. The completion time is adequate to perform the shutdown of the IU in an orderly manner and is acceptable based on the continued availability of redundant components.

b. The ~~N2PS inerting gas supply~~SCAS nitrogen purge check valves prevent backflow of a potential release in the IU cell into the N2PS header. One check valve is provided per parallel N2PS ~~inerting gas~~ supply flow path.

With a check valve inoperable, the IU is required to be placed in Mode 3 within 6 hours and in Mode 0 within [ ]$^{PROP/ECI}$ in order to remove target solution from the IU. Transfer of target solution out of the IU to achieve Mode 0 requires the target solution to be held in the TSV dump tank for at least the minimum period of time specified in LCO 3.1.8 prior to transfer. Approximately [ ]$^{PROP/ECI}$ are required to complete the transfer of target solution to the RPF. The completion time is adequate to perform the shutdown of the IU in an orderly manner and is acceptable based on the continued availability of redundant components.