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OPERATING MANUAL

AMS EMERGENCY KILL SYSTEM

ABERDEEN PVC PLANT

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I. INTRODUCTION - Continued

C. Process Information - continued

Reactor agitation is also required to maintain uniform reactor mixing and efficient heat removal.

If reactor cooling and/or agitation is lost, the polymerization reaction must be stopped. Failure to do so will result in a runaway reaction with increasing temperature and pressure. The reactor pressure would increase until the rupture disc/safety valve assemblies would vent the reactor contents to the atmosphere.

The AMS Emergency Kill System provides the capability of injecting up to 25 gallons of AMS into each of the large reactors and up to 60 gallons into the expansion reactors. This can be done either remotely from the control room or manually at the reactor top manway platform. AMS can be injected into a reactor as soon as agitation is lost to take advantage of mixing caused by residual swirling motion. Maintaining cooling water flow after loss of agitation will also help mixing by refluxing in addition to removing heat of reaction.

II. GENERAL PROCESS DESCRIPTION

Refer to the attached P & I diagrams for the complete system layout for each reactor area.

Emergency kill injection pots are provided at grade level for each reactor. All injection pots are to be maintained at 250 to 275 psig pressure using high pressure nitrogen cylinders. A separate nitrogen

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cylinder and spare are provided for each injection pot. A local AMS level gauge and a pressure gauge are provided on each pot in addition to a board-mounted low pressure alarm and a low level alarm.

The A operator is to check the appropriate injection pot level and pressure before starting each reactor charge sequence.

Killing agent can be injected into the reactor either remotely by the lead operator or locally by the A operator. Normally, the emergency kill system is activated from the board to minimize time and maximize mixing. One switch for each reactor operates automatic double block valves at the reactor top manway level. Placing the switch in automatic mode opens the valves and allows a low level switch in the injection pot to close the valves. Placing the switch in the momentary-contact manual mode also opens the valves but the valves close when the switch is released. Each injection pot low level switch also activates a local light at the manual injection point at the reactor top manway level. The automatic closure of the remote injection valves and the local low level indicator light are provided to prevent nitrogen from being injected into the reactor, blanketing the condenser and reducing cooling efficiency.

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An emergency injection header is provided at the reactor top head level in each reactor module. The header allows any injection pot to be used to kill any reactor in the module or to inject additional killing agent if needed. The procedure requires two hoses, one to connect the injection pot to the header, and one to connect the header to the reactor. Killing agent can then injected locally by the A operator or remotely by the lead operator. It should be noted that when the emergency injection header is used, the injection pot low level switch will neither automatically close the remote injection valves nor light the appropriate local indicator light. Caution should be taken to prevent charging nitrogen into the reactor when using the header.

The remote injection automatic valves are operated by nitrogen supplied by a high pressure nitrogen cylinder and spare. A board-mounted low pressure alarm is provided for each area to alert the board operator when the cylinder in use has dropped below 600 psig. A cylinder with less than 600 psig pressure does not contain enough nitrogen to operate the control valves and is to immediately changed out with a full cylinder.

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III. SAFETY

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The operation of the emergency kill system does not present any extremely hazardous situations. In fact, its main purpose is to reduce the potential for having hazardous situations in the reactor area. However, some potential hazards are present and precautions should be taken to prevent serious incidents.

A. The killing agent AMS has been in use for some time in the plant and the operators are already familiar with the corresponding safety hazards and proper handling procedures. The attached vendor literature describes chemical properties and safe handling procedures. It should be emphasized that AMS is highly reactive in the presence of the peroxide initiators used in the plant. AMS AND INITIATOR SHOULD NEVER BE MIXED UNDER ANY CIRCUMSTANCES.

B. The AMS injection pots are to be maintained at 250 to 275 psig by high pressure nitrogen cylinders. Due caution should be exercised in the handling of nitrogen cylinders. Operators should avoid damaging the outlet valves on these cylinders. The AMS injection pots will contain AMS at 250 to 275 psig pressure, so proper safety precautions should be taken while working with or near these vessels.

An injection pot must be depressurized before the block valve on the AMS fill line is opened.

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The nitrogen supply to the pot must be turned off at the pot prior to venting the pot. The pots are only to be vented through the bleed valve on the pressure gauge/pressure switch piping on the top of the pots.

C. The rupture disk and relief assembly on each injection pot is set to relieve at 400 psig, the vessel design pressure. Since the nitrogen bottle regulator may occasionally leak through, a potential exists for overpressuring an injection pot and causing the rupture disk to burst. Even if the killing agent didn't spray out when the relief devices opened, it is probable the relief valve would not completely reseat and the nitrogen bottle would slowly depressure through the pot and relief valve to atmosphere. The outside operator is to routinely check injection pot pressures to insure it is neither too low nor too high.

D. The AMS killing agent is a volatile hydrocarbon, and thus fire and explosions are theoretically possible. Precautions are to be taken to prevent spills and excessive accumulation of flammable vapors.

E. Since the injection pots are connected to the reactors, a potential exists for backing VCM into the pots. This poses no serious immediate problem since the AMS would kill any reaction that was occurring. However, it could present an exposure problem later when the injection pot is opened.

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