

HUMAN RESPONSE IPLs and HUMAN ERROR PREVENTION IPLs (beyond administrative controls)

IPL RULES

INDEPENDENT

+

CAPABLE

+

MAINTAINED

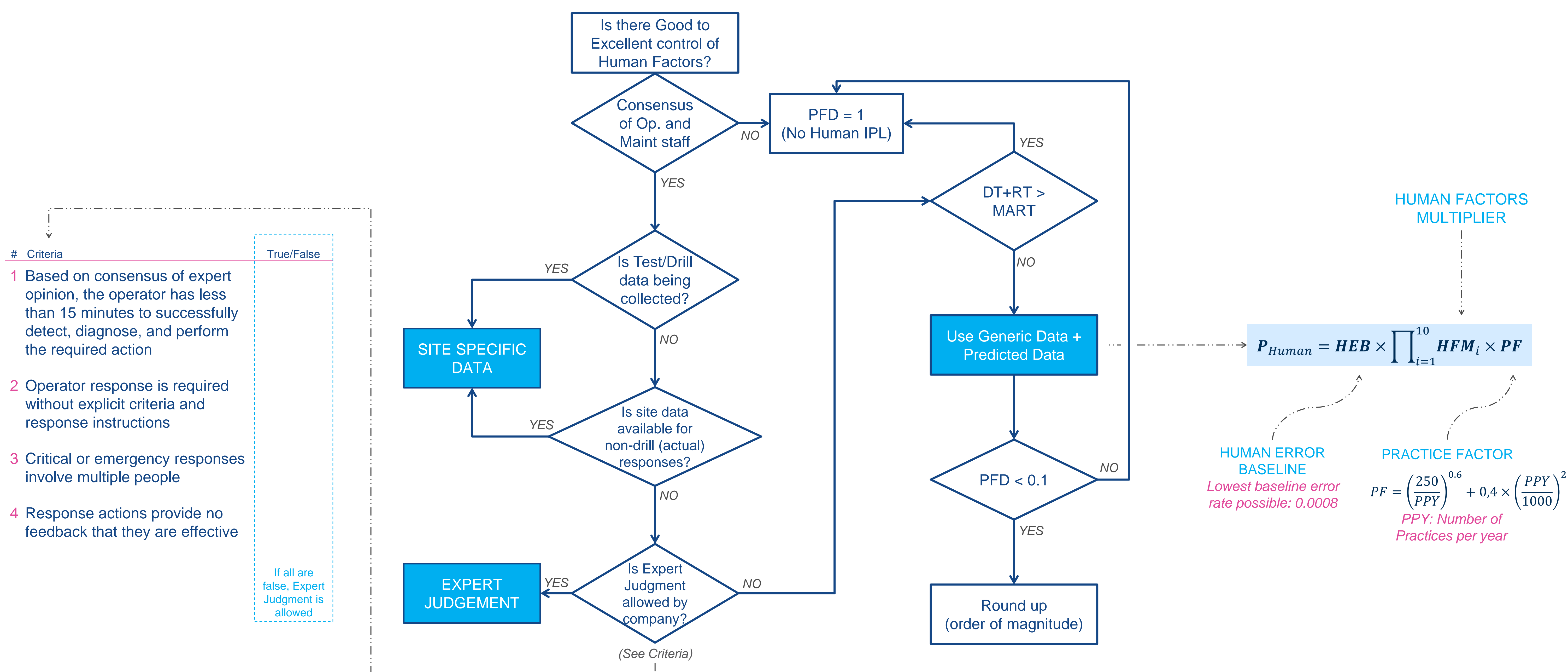
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AUDITED

USING HUMAN AS AN IPL

- Determine which parameters limits should have human response, and why human response is best
- Ensure human response action meets the definition of a *Human Response IPL*
- Develop a troubleshooting guide (general steps for the operators to take) for each response
- Perform initial training on each human response IPL and do one timed drill of each *Human Response IPL* per operator per year
- Validate human response success rates are high enough

VALIDATION APPROACHES FOR HUMAN IPLs



TYPES OF PROTECTION LAYERS - BEYOND ADMINISTRATIVE CONTROLS

Type	Specifics	RRF	Cost (\$K)
Bar Code /Scanner	Bar Code – w/o procedure imbedded; combined with interlocks	3-10	0.1
Bar Code /Scanner	Bar Code – with procedure imbedded; combined with interlocks	3-10	0.3
Proof Switches	RFID (radio frequency identification; the reader is hardwired)	100	5
Proof Switches	Proximity Limit Switches (both ends are hardwired)	10-100	0.5
Hardware	Stand-alone valve (spring loaded dead-man valves; for quick draining/venting)	10-100	0.2 to 1
Hardware	Dry disconnects (auto-closing valve on hose end designed to have no leaks on disconnection)	10-100	TBD
Hardware	Automated/interlocked valve	10-100	1 to 10
Hardware	Captive Key (value depends on how captive key is administered onsite)	10-100	0.5 to 1



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