Table 2. Summary of Baseline and Residual Risks – Tevatron

	Risk Tables Description	Baseline Risk	Residual Risk
2,1	Radiological – Onsite-1 Facility Worker	R: I	R: IV
2.2	Radiological – Onsite-2 Co-located Worker	R: I	R: IV
2.3	Radiological – MOI Offsite	R: III	R: IV
2.4	Toxic Materials – Onsite 1 Facility Worker	R: *	R: *
2.5	Toxic Materials – Onsite 2 Co-located Worker	R: *	R: *
2.6	Toxic Materials – MOI Offsite	R: *	R: *
2.7	Flammable & Combustible Materials – Onsite-1 Facility Worker	R: *	R: *
2.8	Flammable & Combustible Materials – Onsite-2 Co-located worker	R: *	R: *
2.9	Flammable & Combustible Materials – MOI Offsite	R: *	R: *
2.10	Electrical Energy – Onsite-1 Facility Worker	R: *	R: *
2.11	Electrical Energy – Onsite-2 Co-located Worker	R: *	R: *
2.12	Electrical Energy – MOI Offsite	R: *	R: *
2.13	Kinetic Energy – Onsite-1 Facility Worker	R: *	R: *
2.14	Kinetic Energy – Onsite-2 Co-located Worker	R: *	R: *
2.15	Kinetic Energy – MOI Offsite	R: *	R: *
2.16	Potential Energy- Onsite-1 Facility Worker	R: *	R: *
2.17	Potential Energy – Onsite-2 Co-located Worker	R: *	R: *
2.18	Potential Energy – MOI Offsite	R: *	R: *
2.19	Other Hazards – Onsite-1 Facility Worker	R: *	R: *
2.20	Other Hazards – Onsite-2 Co-located Worker	R: *	R: *
2.21	Other Hazards – MOI Offsite	R: *	R: *
2.22	Access & Egress – Onsite-1 Facility Worker	R: *	R: *
2.23	Access & Egress – Onsite-2 Co-located Worker	R: *	R: *
2.24	Access & Egress – MOI Offsite	R: *	R: *
2.25	Environmental Hazards	R: *	R: *

^{*} This hazard has been evaluated within the common Risk Matrix table included in SAD Section I Chapter 04 *Safety Analysis*. Work in the specified areas involving this hazard implements the controls specified in the common Risk Matrix table. No unique controls are in use.

NOTE:

Per DOE-HDBK-1163-2020, Appendix C, "Risk Assessment Methodology":

"Events with an unmitigated risk value of III or IV would not require additional control assignments to provide reasonable assurance of adequate protection. Whereas, for events with an unmitigated risk value of I or II, controls would need to be assigned to either reduce the likelihood or the consequence, and therefore the overall mitigated risk. Generally, preventive controls are applied prior to a loss event – reflecting a likelihood reduction and mitigative controls are applied after a loss event – reflecting a consequence reduction. Each control is credited for a single "bin drop" either in likelihood or consequence; not both. Following a standard hierarchy of controls, controls are applied until the residual risk is acceptable – reflecting a mitigated risk value of III or IV. After controls are credited, events with a remaining unacceptable residual risk (i.e., I or II) are candidates for additional analyses and additional controls, often quantitative in nature." For Fermilab, these controls for accelerator-specific hazards are identified as Credited Controls and further summarized in the Accelerator Safety Envelope (ASE).

Table 2.1 Radiological – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Residual Activation	Hazard: Persons are exposed to residual activation beyond regulatory limits	L: A C: M R: II	 P – Locked Gates: Locked gates are barriers to entrances of areas that contain radioactive material. Keys are required to open these gates. P – Key Control Program: The key control program checks the worker's training prior to issuing them a key to the accelerator enclosure. P – Radiological Work Permit (RWP): The RWP is a permit written by Safety that specifies the work that is permitted to be performed, requirements to perform the work, and limitations of radiological exposure M – Shielding: Shielding is material placed between the irradiated component and the area to be protected. Shielding attenuates radiation flux. 	L: BEU C: L R: IV
	Tevatron, excluding C0 Reference as per the radiation survey dated October 3, 2011, the greatest residual dose rate is 35 mrem/hr at 1 foot in the Tevatron tunnels	L: A C: H R: I	 P - Individual Storage Locations: Irradiated items are stored in individual crypts. Access requires motorized equipment. P - Locked Motorized Equipment: The equipment needed to access the individual crypts is locked P - Radiological Work Permit (RWP): The RWP is a permit written by Safety that specifies the work that is permitted to be performed, requirements to perform the work, and limitations of radiological exposure M - Shielding: Shielding is material placed between the irradiated component and the area to be protected. Shielding attenuates radiation flux. M - Remote Handling - Items stored in C0 are handled remotely, reducing the exposure. 	L: BEU C: L R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Groundwater Activation	Hazard: Radionuclides in ground water exceed regulatory limits	L: C: R:	The Tevatron Area is non-operational; radionuclide production has ceased. See Section I Chapter 4	L: C: R:
Radioactive Waste	Hazards: Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: N R: IV	P – Radioactive waste is not present in the Tevatron. "Non-operational" status precludes generation of waste. This reduces the baseline likelihood to "beyond extremely unlikely".	L: BEU C: N R: IV
	Persons are exposed to residual activation beyond regulatory limits at C0	L: A C: H I: I	 P – Hazard Analysis and Work Planning: Job specific hazard analysis and work planning identifies procedures to prevent exposure beyond allowed limits. Work planning reduces time spent on task. M – Remote Handling: Remote handling allows increased distance between worker and radioactive waste. M – Shielding: Shielding between the worker and the radioactive waste reduces the radiation flux. M – Personal Protective Equipment (PPE); PPE decreases the exposure to radioactive waste. 	L: U C: N R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Contamination	Hazards: Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: N R: IV	 P – Radiation Survey: The radiation survey conducted October 3, 2011, found no accessible contamination. Beam has not been transported since then. This reduces the baseline likelihood to "beyond extremely unlikely". M – The mitigative measurements, "frisk upon exit" and "survey material", remain in place. Before work is conducted, additional preventative and mitigative measures will be determined through a job-specific hazard analysis. 	L: BEU C: N R: IV
	Persons are exposed to residual activation beyond regulatory limits at C0	L: A C: H R: I	 P – Hazard Analysis and Work Planning: Job specific hazard analysis and work planning identifies procedures to prevent exposure beyond allowed limits. Work planning reduces likelihood of workers being exposed to contamination, and reduces the amount of time spent workers are exposed to this hazard. P – Remote Handling: Remote handling prevents worker from directly contacting the contaminated material. M – Shielding: Shielding between the worker and the radioactive waste reduces the radiation flux. M – Personal Protective Equipment (PPE): PPE reduces the consequences of exposure to contamination. If exposure occurs, the contamination remains on the PPE. 	L: EU C: L R: IV

Likelihood (L, of event)/year	Co	nsequence (C, of event)/y	year l	Risk (R, Qualitative R	lanking)	Risk Matrix					
$\mathbf{A} = \text{Anticipated } (L > 1.0E-02)$		$\mathbf{H} = \mathbf{High}$		I = situation (event) of major concern				Likelihood			
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ever	ent) of concern		1	A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low		III = situation (eve	ent) of minor concern	es	Н	I	I	II	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (event) of minimal concern		enc	M	II	II	III	IV
Control(s) Type	C	Offsite (MOI)	Onsite-	-2 (co-located worker)	Onsite-1 (facility worker)	edn	_	***	***	***	***
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ 25.0 rem		C ≥ 100 rem	C ≥ 100 rem	ons	L	III	III	IV	IV
M = Mitigative (reduces event consequences)	M	$25.0 \text{ rem} > \mathbf{C} \ge 5 \text{ rem}$	100	$rem > C \ge 25 \text{ rem}$	100 rem > C ≥ 25 rem	0	N	IV	IV	IV	IV
Acronyms	L	5 rem > C		25 rem > C	25 rem > C						
MOI = Maximally-exposed Offsite Individual rem = Roentgen equivalent man	N	0.5 rem > C		5 rem > C	5 rem > C						

Table 2.2 Radiological – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitativ e Risk (with controls)
Residual Activation	Hazard: Persons are exposed to residual activation beyond regulatory limits	L: A C: H R: I	 P – Locked Gates: Locked gates are barriers to entrances of areas that contain radioactive material. Keys are required to open these gates. P – Key Control Program: The key control program checks the worker's training prior to issuing them a key to the accelerator enclosure. P – Radiological Work Permit (RWP): The RWP is a permit written by Safety that specifies the work that is permitted to be performed, requirements to perform the work, and limitations of radiological exposure M – Shielding: Shielding is material placed between the irradiated component and the area to be protected. Shielding attenuates radiation flux. Note: Additionally, in C0, stored items are handled remotely. 	L: BEU C: M R: IV
Groundwater Activation	Hazard: Radionuclides in ground water exceed regulatory limits	L: C: R:	The Tevatron Area is non-operational; radionuclide production has ceased. See Section I Chapter 4	L: C: R:

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitativ e Risk (with controls)
Radioactive Waste	Hazards: Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: N R: IV	P — Radioactive waste is not present in the Tevatron tunnels. "Non-operational" status precludes generation. This reduces the baseline likelihood to "beyond extremely unlikely".	L: BEU C: N R: IV
	Persons are exposed to residual activation beyond regulatory limits at C0	L: A C:H R:I	 P – Hazard Analysis and Work Planning: Job specific hazard analysis and work planning identifies procedures to prevent exposure beyond allowed limits. Work planning reduces time spent on task. M – Remote Handling: Remote handling allows increased distance between worker and radioactive waste. M – Shielding: Shielding between the worker and the radioactive waste reduces the radiation flux. M – Personal Protective Equipment (PPE); PPE decreases the exposure to radioactive waste. 	L: U C: N R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitativ e Risk (with controls)
Contamination	Hazards: Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: N R: IV	 P - Radiation Survey: The radiation survey conducted October 3, 2011, found no accessible contamination. Beam has not been transported since then. This reduces the baseline likelihood to "beyond extremely unlikely". M - The mitigative measurements, "frisk upon exit" and "survey material", remain in place. Before work is conducted, additional preventative and mitigative measures will be determined through a job-specific hazard analysis. 	L: BEU C: M R: IV
	Persons are exposed to residual activation beyond regulatory limits at C0	L: A C: H R: I	 P – Hazard Analysis and Work Planning: Job specific hazard analysis and work planning identifies procedures to prevent exposure beyond allowed limits. Work planning reduces likelihood of workers being exposed to contamination, and reduces the amount of time spent workers are exposed to this hazard. P – Remote Handling: Remote handling prevents worker from directly contacting the contaminated material. M – Shielding: Shielding between the worker and the radioactive waste reduces the radiation flux. M – Personal Protective Equipment (PPE): PPE reduces the consequences of exposure to contamination. If exposure occurs, the contamination remains on the PPE. 	L: EU C: L R: IV

Likelihood (L, of event)/year		Consequence (C, of event)/year		Risk (R, Qualitative F	Ranking)	Risk Matrix					
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (event) of major concern					Like	lihood	
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (event) of concern		ļ		Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low		III = situation (eve	ent) of minor concern	es	Н	I	I	II	III
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (event) of minimal concern		enc	M	II	II	III	IV
Control(s) Type	C	Offsite (MOI)	Onsit	te-2 (co-located worker)	Onsite-1 (facility worker)	edn	_	TTT	TTT	17.7	13.7
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ 25.0 rem		C ≥ 100 rem	C ≥ 100 rem	ous	L	III	III	IV	IV
M = Mitigative (reduces event consequences)	M	$25.0 \text{ rem} > \mathbf{C} \ge 5 \text{ rem}$	10	$00 \text{ rem} > \mathbf{C} \ge 25 \text{ rem}$	100 rem > C ≥ 25 rem	C	N	IV	IV	IV	IV
Acronyms MOI = Manipus 11 - annu and Official Individual	L	5 rem > C		25 rem > C	25 rem > C						
MOI = Maximally-exposed Offsite Individual rem = Roentgen equivalent man	N	0.5 rem > C		5 rem > C	5 rem > C						

Table 2.3 Radiological – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Residual Activation	Hazards: Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: H R: III	 P – Public Access Gates: Public access gates prevent unauthorized access to the Tevatron Area by the public, thus reducing the baseline likelihood to "beyond extremely unlikely". M – Shielding: Shielding is material placed between the irradiated component and the area to be protected. Shielding attenuates radiation flux. The Tevatron tunnels (the location of the activated components) are underground; the earthen overburden provides more than sufficient shielding. 	L: BEU C:M R: IV
	Persons are exposed to residual activation beyond regulatory limits at CO	L: BEU C: H R: III	 P – Public access gates prevent unauthorized access to the Tevatron Area (thusly, C0) by the public, thus reducing the baseline likelihood to "beyond extremely unlikely". M – Shielding: Shielding is material placed between the irradiated component and the area to be protected. Shielding attenuates radiation flux. 	L: BEU C: M R: IV
Groundwater Activation	Hazard: Radionuclides in ground water exceed regulatory limits	L: C: R:	The Tevatron Area is non-operational; radionuclide production has ceased. See Section I Chapter 4	L: C: R:

Radioactive	Hazards:			
Waste	Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: N R: IV	P — Radioactive waste is not present in the Tevatron. "Non-operational" status precludes generation. This reduces the baseline likelihood to "beyond extremely unlikely"; baseline consequence is "negligible".	L: BEU C: N R: IV
	Persons are exposed to residual activation beyond regulatory limits at C0	L: BEU C: H R: III	 P – Public access gates prevent unauthorized access to C0 by the public, thus reducing the baseline likelihood to "beyond extremely unlikely". M – Shielding: Shielding is material placed between the irradiated component and the area to be protected. Shielding attenuates radiation flux. 	L: BEU C: M R: IV
Contamination	Hazard:			
	Persons are exposed to residual activation beyond regulatory limits at Tevatron	L: BEU C: N R: IV	P – Public access gates prevent unauthorized access to the Tevatron Area by the public, thus reducing the baseline likelihood to "beyond extremely unlikely". Additionally, the radiation survey conducted October 3, 2011, found no accessible contamination. Finally, beam can no longer be transported through these sections. Therefore, contamination cannot be produced. No mitigation is necessary	L: BEU C: N R: IV
	Persons are exposed to residual activation beyond regulatory limits at C0	L: BEU C: H R: III	 P – Public access gates prevent unauthorized access to C0 by the public, thus reducing the baseline likelihood to "beyond extremely unlikely". M – ES&H survey and cleaning: Survey and cleaning ensures that contamination is not present beyond the building. 	L: BEU C: M R: IV

Radiological Hazard Consequences, derived from Figu	re C-1, "Example Qualitative Con	sequence Matrix", DOE-HDBK-1163-2020.					
Likelihood (L, of event)/year	Consequence (C, of event)/year	Risk (R, Qualitative Ranking)	Risk Matri				
A = Anticipated (L > 1.0E-02)	KISK Mauri	X	Likelihood				
U = Unlikely (1.0E-02> L > 1.0E-04)	$\mathbf{M} = \mathbf{Moderate}$	II = situation (event) of concern		A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)	$\mathbf{L} = \mathbf{Low}$	III = situation (event) of minor concern	Офн	Ţ	ī	п	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)	N = Negligible	IV = situation (event) of minimal concern		-	4		

Control(s) Type	C	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	M	II	П	III	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ 25.0 rem	C ≥ 100 rem	C ≥ 100 rem	ī	III	Ш	IV	IV
M = Mitigative (reduces event consequences)	M	25.0 rem $>$ C \geq 5 rem	$100 \text{ rem} > \mathbb{C} \ge 25 \text{ rem}$	$100 \text{ rem} > \mathbf{C} \ge 25 \text{ rem}$				- '	
Acronyms MOI = Maximally-exposed Offsite Individual	L	5 rem > C	25 rem > C	25 rem > C	N	IV	IV	IV	IV
rem = Roentgen equivalent man	N	0.5 rem > C	5 rem > C	5 rem > C					

Table 2.4 Toxic Materials – Onsite 1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Lead *	Hazard: Potential exposure to lead	L: A	See Section I Chapter 4	L: BEU
	dust during manual handling of un-	С:Н		C: M
	encased lead bricks, lead shot, and	R: I		R: IV
	lead sheets.			

Chemical Hazard Consequences, derived from Figure	C-1	, "Example Qualitative	Conseq	quence Matrix", DOE-	HDBK-1163-2020.								
Likelihood (L, of event)/year	C	onsequence (C, of event)/year	Risk (R, Qualitative Ranking)			Risk Matrix						
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	nt) of major concern				Likelihood				
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern	l —	1	Α	U	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low		III = situation (e	vent) of minor concern	es	Н	I	I	II	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV		
Control(s) Type	C	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)	edn	т .	III	III	IV	IV		
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ PAC-2		C ≥ PAC-3	C ≥ IDLH	ons	L	111	111	1 V	1 V		
M = Mitigative (reduces event consequences)	M	$PAC-2 > C \ge PAC-1$	P.A	$AC-3 > C \ge PAC-2$	$IDLH > C \ge PEL \text{ or } TLV_c$		N	IV	IV	IV	IV		
Acronyms IDLH = Immediately Dangerous to Life and Health	L	PAC-1 > C		PAC-2 > C	PEL or $TLV_c > C$								
MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit	N	Consequences less than those for Low Consequence Level		nsequences less than for Low Consequence Level	Consequences less than those for Low Consequence Level								
TLV_c = Threshold Limit Value (ceiling)													

Table 2.5 Toxic Materials – Onsite 2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Lead *	Hazard: Potential exposure to lead	L: A	See Section I Chapter 4	L: BEU
	dust during manual handling of un-	C:H		C: M
	encased lead bricks, lead shot, and	R: I		R: IV
	lead sheets.			

C-1	, "Example Qualitative	Conseq	quence Matrix", DOE-	HDBK-1163-2020.								
C	onsequence (C, of event)/year	Risk (R, Qualitative Ranking)			Risk Matrix						
	$\mathbf{H} = \mathbf{High}$		I = situation (eve	nt) of major concern				Likelihood				
	$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern		1	A	U	EU	BEU		
	L = Low		III = situation (e	vent) of minor concern	S	Н	I	I	II	III		
	N = Negligible		IV = situation (ex	vent) of minimal concern	enc	M	П	II	III	IV		
C	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)	nbə	т	TTT	111	137	IV		
Н	C ≥ PAC-2		C ≥ PAC-3	C ≥ IDLH	Suo	L	111	111	1 V	1 V		
M	$PAC-2 > C \ge PAC-1$	P.A	$AC-3 > C \ge PAC-2$	$IDLH > C \ge PEL \text{ or } TLV_c$		N	IV	IV	IV	IV		
L	PAC-1 > C		PAC-2 > C	PEL or TLV _c > C								
N	Consequences less than those for Low Consequence Level		*	Consequences less than those for Low Consequence Level								
	C	Consequence (C, of event $H = High$ $M = Moderate$ $L = Low$ $N = Negligible$ C Offsite (MOI) H $C \ge PAC-2$ M $PAC-2 > C \ge PAC-1$ L $PAC-1 > C$ N Consequences less than those for Low	Consequence (C, of event)/year $H = High$ $M = Moderate$ $L = Low$ $N = Negligible$ C Offsite (MOI) Onsite $H C \ge PAC-2$ $M PAC-2 > C \ge PAC-1 PAC-1 > C$ N Consequences less Contain those for Low those	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		

Table 2.6 Toxic Materials – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Lead *	Hazard: Potential exposure to lead	L: A	See Section I Chapter 4	L: BEU
	dust during manual handling of un-	C:H		C: M
	encased lead bricks, lead shot, and	R: I		R: IV
	lead sheets.			

Chemical Hazard Consequences, derived from Figure	C-1	, "Example Qualitative	Conseq	quence Matrix", DOE-	HDBK-1163-2020.								
Likelihood (L, of event)/year	C	onsequence (C, of event)/year	Risk (R, Qualitative Ranking)			Risk Matrix						
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	nt) of major concern				Likelihood				
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern		1	A	U	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low		III = situation (e	vent) of minor concern	es	Н	I	I	II	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ex	vent) of minimal concern	enc	M	П	II	III	IV		
Control(s) Type	C	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)	nbə	т	III	III	IV	IV		
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ PAC-2		C ≥ PAC-3	C ≥ IDLH	Suo	L	111	111	1 V	1 V		
M = Mitigative (reduces event consequences)	M	$PAC-2 > C \ge PAC-1$	P.A	$AC-3 > C \ge PAC-2$	$IDLH > C \ge PEL \text{ or } TLV_c$		N	IV	IV	IV	IV		
Acronyms IDLH = Immediately Dangerous to Life and Health	L	PAC-1 > C		PAC-2 > C	PEL or TLV _c > C								
MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit	N	Consequences less than those for Low Consequence Level		nsequences less than for Low Consequence Level	Consequences less than those for Low Consequence Level								
TLV _c = Threshold Limit Value (ceiling)													

Table 2.7 Flammable and Combustible Materials – Onsite -1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Combustible materials (cables, Boxes, Paper,	Hazard: Burns	L: A C: H R: I	See Section I Chapter 4	L: BEU C: L R: IV
wood cribbing, etc.)				

Other Hazard Consequences, derived from Figure C-	Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.														
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year	Risk (R, Qualitative	Ranking)	Risk	Matri	rix							
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	I = situation (event) of major concern				Like	lihood					
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (event) of concern				Α	U	EU	BEU				
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low	L = Low		vent) of minor concern	es	Н	I	I	II	III				
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	vent) of minimal concern	ences	M	II	II	III	IV				
Control(s) Type	C	Offsite (MOI)	Offsite (MOI) Onsite-2 (co		Onsite-1 (facility worker)	nbəs	_	***	***	***	***				
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C > Pr	compt worker fatality	C ≥ Prompt worker		L	III	III	IV	IV				
M = Mitigative (reduces event consequences)		other serious effects,		icute injury that is	fatality or acute injury that	Col	N	IV	IV	IV	IV				
Acronyms		or symptoms which		nmediately life-	is immediately life-										
MOI = Maximally-exposed Offsite Individual		could impair an threatening or permanently		threatening or											
		individual's ability to		disabling.	permanently disabling.										
		take protective		C											
		action.													
	M	C ≥ Mild, transient	C ≥	Serious injury, no	C ≥ Serious injury, no										
		adverse effects.		ediate loss of life no	immediate loss of life no										
			pern	nanent disabilities;	permanent disabilities;										
			hospi	italization required.	hospitalization required.										
	L	Mild, transient	M	linor injuries; no	Minor injuries; no										
		adverse effects > C	ho	spitalization > C	hospitalization > C										
	N	Consequences less	Cons	sequences less than	Consequences less than										
		than those for Low	those f	or Low Consequence	those for Low										
		Consequence Level		Level	Consequence Level										

Table 2.8 Flammable and Combustible Materials – Onsite -2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Combustible materials (cables, Boxes, Paper, wood cribbing, etc.)	Hazard: Burns	L: A C: H R: I	See Section I Chapter 4	L: BEU C: L R: IV

Other Hazard Consequences, derived from Figure C-1	1, "E	Example Qualitative Conse	equence Matrix", DOE-HD	BK-1163-2020.						
Likelihood (L, of event)/year	C	onsequence (C, of event)/y	rear Risk (R, Qualitative	Ranking)	Risk	Matri	X			
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$	I = situation (eve	ent) of major concern				Like	lihood	
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$	II = situation (even	ent) of concern			A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low	III = situation (ex	vent) of minor concern	es	Н	I	I	II	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	vent) of minimal concern	ences	M	II	II	III	IV
Control(s) Type	C	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sedno					
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C ≥ Prompt worker fatality	C ≥ Prompt worker	Conse	L	III	III	IV	IV
M = Mitigative (reduces event consequences)		other serious effects,	or acute injury that is	fatality or acute injury that	ŭ	N	IV	IV	IV	IV
Acronyms		or symptoms which	immediately life-	is immediately life-						
MOI = Maximally-exposed Offsite Individual			threatening or permanently	threatening or						
		individual's ability to	disabling.	permanently disabling.						
		take protective	6							
		action.								
	M	C ≥ Mild, transient	C ≥ Serious injury, no	C ≥ Serious injury, no						
		adverse effects.	immediate loss of life no	immediate loss of life no						
			permanent disabilities;	permanent disabilities;						
			hospitalization required.	hospitalization required.						
	L	Mild, transient	Minor injuries; no	Minor injuries; no						
		adverse effects > C	hospitalization > C	hospitalization > C						
	N	Consequences less	Consequences less than	Consequences less than						
		than those for Low t	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

Table 2.9 Flammable and Combustible Materials – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Combustible	Hazard: Burns	L: A	See Section I Chapter 4	L: BEU
materials (cables,		C: H		C: L
Boxes, Paper,		R: I		R: IV
wood cribbing,				
etc.)				

Other Hazard Consequences, derived from Figure C-1	l, "E	Example Qualitative Conse	quence Matrix", DOE-HD	BK-1163-2020.										
Likelihood (L, of event)/year	C	onsequence (C, of event)/y	ear Risk (R, Qualitative	Ranking)	Risk	Matri	íx							
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$	I = situation (eve	I = situation (event) of major concern				Like	lihood					
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$	II = situation (ev	ent) of concern			A	U	EU	BEU				
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low	III = situation (e	vent) of minor concern	es	Н	I	I	II	III				
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	vent) of minimal concern	ences	M	II	II	III	IV				
Control(s) Type	C	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sedno									
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	$C \ge Prompt worker fatality$	C ≥ Prompt worker		L	III	III	IV	IV				
M = Mitigative (reduces event consequences)		other serious effects,	or acute injury that is	fatality or acute injury that	Col	N	IV	IV	IV	IV				
Acronyms		or symptoms which	immediately life-	is immediately life-										
MOI = Maximally-exposed Offsite Individual		, i	threatening or permanently	threatening or										
		individual's ability to	disabling.	permanently disabling.										
		take protective	g	Fg.										
		action.												
	M	C ≥ Mild, transient	C ≥ Serious injury, no	C ≥ Serious injury, no										
		adverse effects.	immediate loss of life no	immediate loss of life no										
			permanent disabilities;	permanent disabilities;										
			hospitalization required.	hospitalization required.										
	L Mild, transient		Minor injuries; no	Minor injuries; no										
		adverse effects > C	hospitalization > C	hospitalization > C										
	N	Consequences less	Consequences less than	Consequences less than										
		than those for Low ti	hose for Low Consequence	those for Low										
		Consequence Level	Level	Consequence Level										

Table 2.10 Electrical Energy – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
High Voltage	Hazard: Electric shock	L: A	See Section I Chapter 4	L: BEU
Exposure		C: H		C: M
		R: I		R: IV
Low Voltage,	Hazard: Electric shock	L: A	See Section I Chapter 4	L: BEU
High Current		C: H		C: M
Exposure.		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.															
Likelihood (L, of event)/year	C	onsequence (C, of event)/	/year	Risk (R, Qualitative	Ranking)	Risk	Matri	ix							
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (event) of major concern					Like						
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (even	ent) of concern		1	A	U	EU	BEU				
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$		III = situation (ev	vent) of minor concern	es	Н	I	I	II	III				
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV				
Control(s) Type	C	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	sednences	_	777	TTT	77.7	TX 7				
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	$C \ge Pro$	ompt worker fatality	C ≥ Prompt worker	ous	L	III	III	IV	IV				
M = Mitigative (reduces event consequences)		other serious effects,		cute injury that is	fatality or acute injury that		N	IV	IV	IV	IV				
Acronyms		or symptoms which		nmediately life-	is immediately life-					•					
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or permanently		threatening or										
		individual's ability to		disabling.	permanently disabling.										
		take protective													
		action.													
	M	C ≥ Mild, transient	C ≥ :	Serious injury, no	C ≥ Serious injury, no										
		adverse effects.	imme	diate loss of life no	immediate loss of life no										
			perm	nanent disabilities;	permanent disabilities;										
			hospi	talization required.	hospitalization required.										
	L	Mild, transient	Mi	inor injuries; no	Minor injuries; no										
		adverse effects > C	hos	spitalization > C	hospitalization > C										
	N	Consequences less	Cons	equences less than	Consequences less than										
		than those for Low	those fo	or Low Consequence	those for Low										
		Consequence Level		Level	Consequence Level										

Table 2.11 Electrical Energy 1 Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
High Voltage	Hazard: Electric shock	L: A	See Section I Chapter 4	L: BEU
Exposure		C: H		C: M
		R: I		R: IV
Low Voltage,	Hazard: Electric shock	L: A	See Section I Chapter 4	L: BEU
High Current		C: H		C: M
Exposure.		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.															
Likelihood (L, of event)/year	C	onsequence (C, of event)/	/year	Risk (R, Qualitative	Ranking)	Risk	Matri	ix							
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (event) of major concern					Like						
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (even	ent) of concern		1	A	U	EU	BEU				
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$		III = situation (ev	vent) of minor concern	es	Н	I	I	II	III				
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV				
Control(s) Type	C	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	sednences	_	777	TTT	77.7	TX 7				
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	$C \ge Pro$	ompt worker fatality	C ≥ Prompt worker	ous	L	III	III	IV	IV				
M = Mitigative (reduces event consequences)		other serious effects,		cute injury that is	fatality or acute injury that		N	IV	IV	IV	IV				
Acronyms		or symptoms which		nmediately life-	is immediately life-					•					
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or permanently		threatening or										
		individual's ability to		disabling.	permanently disabling.										
		take protective													
		action.													
	M	C ≥ Mild, transient	C ≥ :	Serious injury, no	C ≥ Serious injury, no										
		adverse effects.	imme	diate loss of life no	immediate loss of life no										
			perm	nanent disabilities;	permanent disabilities;										
			hospi	talization required.	hospitalization required.										
	L	Mild, transient	Mi	inor injuries; no	Minor injuries; no										
		adverse effects > C	hos	spitalization > C	hospitalization > C										
	N	Consequences less	Cons	equences less than	Consequences less than										
		than those for Low	those fo	or Low Consequence	those for Low										
		Consequence Level		Level	Consequence Level										

Table 2.12 Electrical Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
High Voltage	Hazard: Electric shock	L: A	See Section I Chapter 4	L: BEU
Exposure		C: H		C: M
		R: I		R: IV
Low Voltage,	N/A	L: A	See Section I Chapter 4	L: BEU
High Current		C: H		C: M
Exposure.		R: I		R: IV

Other Hazard Consequences, derived from Figure C-	1, "F	Example Qualitative Cons	equence Matrix", DOE-HD	PBK-1163-2020.							
Likelihood (L, of event)/year A = Anticipated (L > 1.0E-02)	C	onsequence (C, of event)/y H = High	I = situation (eve	ent) of major concern	Risk	Matri	A	Likelihood			
U = Unlikely (1.0E-02 > L > 1.0E-04) EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06) BEU = Beyond Extremely Unlikely (1.0E-06 > L)		 M = Moderate L = Low N = Negligible 	,	vent) of concern vent) of minor concern vent) of minimal concern	ences	H M	I II	I	II	BEU III IV	
Control(s) Type P = Preventive (reduce event occurrence likelihood)	C H	Offsite (MOI)	Onsite-2 (co-located worker) C ≥ Prompt worker fatality	Onsite-1 (facility worker) C ≥ Prompt worker	Conseque	L	III	III	IV	IV	
M = Mitigative (reduces event occurrence intermood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual		other serious effects, or symptoms which could impair an individual's ability to take protective action.	or acute injury that is immediately life-threatening or permanently disabling.	fatality or acute injury that is immediately life- threatening or permanently disabling.		N	IV	IV	IV	IV	
	M	C ≥ Mild, transient adverse effects. Mild, transient	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no							
	L N	adverse effects > C	hospitalization > C	hospitalization > C							
	11	Consequences less than those for Low Consequence Level	Consequences less than those for Low Consequence Level	Consequences less than those for Low Consequence Level							

Table 2.13 Kinetic Energy – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Power Tools	Hazard: Injury	L: A	See Section I Chapter 4	L: EU
1 Owel 100is		C: H		C: M
		R: I		R: III
Pumps and	Hazard: Injury	L: A	See Section I Chapter 4	L: BEU
Motors		C: H		C: M
		R: I		R: IV
Mobile Shielding	Hazard: Personnel injury due to	L: A	See Section I Chapter 4	L: BEU
	pinch points, tip-overs, caught in	C: H		C: H
	between, crushing	R: I		R: III

Other Hazard Consequences, derived from Figure C-	1, "F	Example Qualitative Conse	equence Matrix", DOE-HD	BK-1163-2020.								
Likelihood (L, of event)/year A = Anticipated (L > 1.0E-02) U = Unlikely (1.0E-02> L >1.0E-04)	C	onsequence (C, of event)/y H = High M = Moderate	I = situation (eve	ent) of major concern	Risk	Matri	A	Likelihood				
EU = Extremely Unlikely $(1.0\text{E}-04 > \text{L} > 1.0\text{E}-06)$ BEU = Beyond Extremely Unlikely $(1.0\text{E}-06 > \text{L})$		$\mathbf{L} = \mathbf{Low}$ $\mathbf{N} = \mathbf{Negligible}$	1	vent) of concern vent) of minor concern vent) of minimal concern	ences	H M	I II	I	II III	BEU III IV		
Control(s) Type P = Preventive (reduce event occurrence likelihood)	С	Offsite (MOI)	Onsite-2 (co-located worker) $C \ge \text{Prompt worker fatality}$	Onsite-1 (facility worker)	nbəsı	L	III	III	IV	IV		
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual 		other serious effects, or symptoms which	or acute injury that is immediately life-threatening or permanently disabling.	fatality or acute injury that is immediately life-threatening or permanently disabling.	Cor	N	IV	IV	IV	IV		
	М	C ≥ Mild, transient adverse effects.	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.								
	L	Mild, transient adverse effects > C	Minor injuries; no hospitalization > C	Minor injuries; no hospitalization > C								
	N	Consequences less than those for Low Consequence Level	Consequences less than hose for Low Consequence Level	Consequences less than those for Low Consequence Level								

Table 2.14 Kinetic Energy – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Power Tools	Hazard: Injury	L: A	See Section I Chapter 4	L: EU
1 Owel 100is		C: H		C: L
		R: I		R: IV
Pumps and	Hazard: Injury	L: A	See Section I Chapter 4	L: BEU
Motors		C: H		C: L
		R: I		R: IV
Mobile Shielding	Hazard: Personnel injury due to	L: A	See Section I Chapter 4	L: BEU
	pinch points, tip-overs, caught in	C: H		C: H
	between, crushing	R: I		R: III

Other Hazard Consequences, derived from Figure C-1	l, "E	xample Qualitative Con	sequer	nce Matrix", DOE-HD	BK-1163-2020.									
Likelihood (L, of event)/year	C	onsequence (C, of event)	/year	Risk (R, Qualitative	Ranking)	Risl	k Matr	ix						
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	ent) of major concern				Like	lihood				
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern		1	A	U	EU	BEU			
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low		III = situation (e	vent) of minor concern	es	Н	I	I	II	III			
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV			
Control(s) Type	С	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)	sednences	L	III	III	IV	IV			
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual 		C ≥ Irreversible, other serious effects, or symptoms which could impair an individual's ability to take protective action.	or i	Prompt worker fatality acute injury that is immediately life-tening or permanently disabling.	C ≥ Prompt worker fatality or acute injury that is immediately lifethreatening or permanently disabling.	Con	N	IV	IV	IV	IV			
	M L	C ≥ Mild, transient adverse effects. Mild, transient adverse effects > C	imm per hosp	≥ Serious injury, no nediate loss of life no rmanent disabilities; pitalization required. Minor injuries; no ospitalization > C	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no hospitalization > C									

Table 2.15 Kinetic Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Power tools	Hazard: Injury	L: A	See Section I Chapter 4	L: BEU
1 OWEI TOOIS		C: H		C: M
		R: I		R: IV
Pumps and	Hazard: Injury	L: A	See Section I Chapter 4	L: BEU
Motors		C: H		C: A
		R: I		R: III
Mobile Shielding	Hazard: N/A	L:	See Section I Chapter 4	L:
		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1	, "E	xample Qualitative Con	sequer	nce Matrix", DOE-HD	BK-1163-2020.							
Likelihood (L, of event)/year	C	onsequence (C, of event)	/year	Risk (R, Qualitative	Ranking)	Risk Matrix						
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (event) of major concern								
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern		1	A	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low		III = situation (ev	vent) of minor concern	se	Н	I	I	II	III	
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV	
Control(s) Type	C	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)	sedneuces	L	III	III	IV	IV	
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual 	Н	C ≥ Irreversible, other serious effects, or symptoms which could impair an individual's ability to take protective action.	or i	Prompt worker fatality acute injury that is immediately lifetening or permanently disabling.	C ≥ Prompt worker fatality or acute injury that is immediately lifethreatening or permanently disabling.	Con	N	IV	IV	IV	IV	
	M L	C ≥ Mild, transient adverse effects. Mild, transient adverse effects > C	imm per hosp	≥ Serious injury, no nediate loss of life no manent disabilities; pitalization required. Minor injuries; no ospitalization > C	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no hospitalization > C							

Table 2.16 Potential Energy – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Crane Operations	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV
Material Handling	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.											
Likelihood (L, of event)/year	C	onsequence (C, of event)/	/year	Risk (R, Qualitative	Ranking)	Risk	Matri	X			
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	ent) of major concern				Like		
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern		1	A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$		III = situation (ev	vent) of minor concern	es	Н	I	I	II	III
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV
Control(s) Type	C	L = Low III = situation (event) of minor concern N = Negligible IV = situation (event) of minimal concern Offsite (MOI) Onsite-2 (co-located worker) Onsite-1 (facility worker)			TTT	777	13.7	13.7			
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C ≥ Pro	ompt worker fatality	$C \ge \text{Prompt worker}$	ous	L	III	III	IV	IV
M = Mitigative (reduces event consequences)		other serious effects,		cute injury that is	fatality or acute injury that		N	IV	IV	IV	IV
Acronyms		or symptoms which		immediately life-						•	
MOI = Maximally-exposed Offsite Individual		could impair an		ning or permanently	threatening or						
		individual's ability to		disabling.	permanently disabling.						
		take protective		C							
		action.									
	M	C ≥ Mild, transient	Mild, transient $C \ge$ Serious injury, no $C \ge$ Serious injury, no								
		adverse effects.	immed	diate loss of life no	immediate loss of life no						
			perm	nanent disabilities;	permanent disabilities;						
			hospit	talization required.	hospitalization required.						
	L	Mild, transient	Mi	inor injuries; no	Minor injuries; no						
		adverse effects > C	hos	spitalization > C	hospitalization > C						
	N	Consequences less	Conse	equences less than	Consequences less than						
		than those for Low	those fo	or Low Consequence	those for Low						
		Consequence Level		Level	Consequence Level						

Table 2.17 Potential Energy – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Crane Operations	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV
Material Handling	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.											
Likelihood (L, of event)/year	C	onsequence (C, of event)/	/year l	Risk (R, Qualitative	Ranking)	Risk	Matri	X			
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	ent) of major concern				Like		
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		$\mathbf{H} = \text{situation (ev}$	ent) of concern		1	A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$		III = situation (ev	vent) of minor concern	es	Н	I	I	II	III
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV
Control(s) Type	C	L = Low N = Negligible IV = situation (event) of minor concern IV = situation (event) of minimal concern Offsite (MOI) Onsite-2 (co-located worker) Onsite-1 (facility worker)			TTT	777	13.7	13.7			
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C ≥ Pro	ompt worker fatality	$C \ge \text{Prompt worker}$	ous	L	III	III	IV	IV
M = Mitigative (reduces event consequences)		other serious effects,		cute injury that is	fatality or acute injury that		N	IV	IV	IV	IV
Acronyms		or symptoms which		immediately life-						•	
MOI = Maximally-exposed Offsite Individual		could impair an		ning or permanently	threatening or						
		individual's ability to		disabling.	permanently disabling.						
		take protective		· ·							
		action.									
	M	C ≥ Mild, transient	sient $C \ge$ Serious injury, no $C \ge$ Serious injury, no								
		adverse effects.	immed	diate loss of life no	immediate loss of life no						
			perma	anent disabilities;	permanent disabilities;						
			hospit	talization required.	hospitalization required.						
	L	Mild, transient	Mi	nor injuries; no	Minor injuries; no						
		adverse effects > C	hos	spitalization > C	hospitalization > C						
	N	Consequences less	Conse	equences less than	Consequences less than						
		than those for Low	those fo	or Low Consequence	those for Low						
		Consequence Level		Level	Consequence Level						

Table 2.18 Potential Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Crane Operations	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: H
		R: I		R: III
Material Handling	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: H
		R: I		R: III

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.										
Likelihood (L, of event)/year	C	onsequence (C, of event)/	year Risk (R, Qualitativ	e Ranking)	Risk	Matri	X			
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$	I = situation (ev	ent) of major concern				Like		
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$	II = situation (e	vent) of concern	l ——	1	A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$	III = situation (event) of minor concern	ses	Н	I	I	II	III
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible	IV = situation (event) of minimal concern	enc	M	II	II	III	IV
Control(s) Type	C	L = Low N = Negligible IV = situation (event) of minor concern IV = situation (event) of minimal concern Offsite (MOI) Onsite-2 (co-located worker) Onsite-1 (facility worker)		_	TTT	777	17.7	TX 7		
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	$C \ge Prompt$ worker fatality	$C \ge \text{Prompt worker}$	ous	L	III	III	IV	IV
M = Mitigative (reduces event consequences)		other serious effects,	or acute injury that is	fatality or acute injury that		N	IV	IV	IV	IV
Acronyms		or symptoms which	immediately life-	is immediately life-					•	
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or permanently	· ·						
		individual's ability to	disabling.	permanently disabling.						
		take protective	C							
		action.								
	M	C ≥ Mild, transient	C ≥ Serious injury, no	C ≥ Serious injury, no						
		adverse effects.	immediate loss of life no	immediate loss of life no						
			permanent disabilities;	permanent disabilities;						
			hospitalization required.	hospitalization required.						
	L	Mild, transient	Minor injuries; no	Minor injuries; no						
		adverse effects > C	hospitalization > C	hospitalization > C						
	N	Consequences less	Consequences less than	Consequences less than						
		than those for Low	those for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

Table 2.19 Other hazards – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Confined Spaces	Hazard: asphyxiation	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV
Ergonomics	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.											
Likelihood (L, of event)/year	C	onsequence (C, of event)/	/year	Risk (R, Qualitative	Ranking)	Risk	Matri	X			
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (eve	nt) of major concern				Like		
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		$\mathbf{II} = \text{situation (ev}$	ent) of concern		1	A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$		III = situation (ev	vent) of minor concern	ses	Н	I	I	II	III
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (ev	vent) of minimal concern	ienc	M	II	II	III	IV
Control(s) Type	C	L = Low III = situation (event) of minor concern N = Negligible IV = situation (event) of minimal concern Offsite (MOI) Onsite-2 (co-located worker) Onsite-1 (facility worker)		_	777	TTT	77.7	TX 7			
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C ≥ Pr	ompt worker fatality	C ≥ Prompt worker	Suo	L	III	III	IV	IV
M = Mitigative (reduces event consequences)		other serious effects,		cute injury that is	fatality or acute injury that	0	N	IV	IV	IV	IV
Acronyms		or symptoms which		nmediately life-	is immediately life-					•	
MOI = Maximally-exposed Offsite Individual		could impair an		ening or permanently	threatening or						
		individual's ability to		disabling.	permanently disabling.						
		take protective		· ·							
		action.									
	M	C ≥ Mild, transient	fild, transient $C \ge$ Serious injury, no $C \ge$ Serious injury, no								
		adverse effects.	imme	ediate loss of life no	immediate loss of life no						
			perm	nanent disabilities;	permanent disabilities;						
			hospi	italization required.	hospitalization required.						
	L	Mild, transient	M	inor injuries; no	Minor injuries; no						
		adverse effects > C	ho	spitalization > C	hospitalization > C						
	N	Consequences less	Cons	sequences less than	Consequences less than						
		than those for Low	those fo	or Low Consequence	those for Low						
		Consequence Level		Level	Consequence Level						

Table 2.20 Other hazards – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Confined Spaces	Hazard: asphyxiation	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV
Ergonomics	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.												
Likelihood (L, of event)/year	C	onsequence (C, of event)	/year	Risk (R, Qualitative	Ranking)	Risk Matrix						
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$		I = situation (event) of major concern					Like			
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$		II = situation (ev	ent) of concern		1	A	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		$\mathbf{L} = \mathbf{Low}$		III = situation (ev	vent) of minor concern	se	Н	I	I	II	III	
BEU = Beyond Extremely Unlikely $(1.0E-06 > L)$		N = Negligible		IV = situation (ev	vent) of minimal concern	ences	M	II	II	III	IV	
Control(s) Type	C	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	т.	TTT	777	13.7	13.7	
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	$C \ge P$	rompt worker fatality	$C \ge \text{Prompt worker}$	ous	L	III	III	IV	IV	
M = Mitigative (reduces event consequences)		other serious effects,		acute injury that is	fatality or acute injury that		N	IV	IV	IV	IV	
Acronyms		or symptoms which		mmediately life-								
MOI = Maximally-exposed Offsite Individual		could impair an		ening or permanently	threatening or							
		individual's ability to		disabling.	permanently disabling.							
		take protective		C								
		action.										
	M	C ≥ Mild, transient	C ≥	≥ Serious injury, no	C ≥ Serious injury, no							
		adverse effects.	imm	ediate loss of life no	immediate loss of life no							
			per	manent disabilities;	permanent disabilities;							
			hosp	oitalization required.	hospitalization required.							
	L	Mild, transient	N	Minor injuries; no	Minor injuries; no							
		adverse effects > C	h	ospitalization > C	hospitalization > C							
	N	Consequences less	Con	sequences less than	Consequences less than							
		than those for Low	those	for Low Consequence	those for Low							
		Consequence Level		Level	Consequence Level							

Table 2.21 Other hazards – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Confined Spaces	Hazard: asphyxiation	L: A	See Section I Chapter 4	L: BEU
		C: H		C: A
		R: I		R: III
Ergonomics	Hazard: injury	L: A	See Section I Chapter 4	L: BEU
		C: H		C: A
		R: I		R: III

Other Hazard Consequences, derived from Figure C-1	, "F	Example Qualitative Cons	sequen	nce Matrix", DOE-HD	BK-1163-2020.								
Likelihood (L, of event)/year A = Anticipated (L > 1.0E-02)	C	onsequence (C, of event)/ H = High	year/	Risk (R, Qualitative	Ranking) nt) of major concern	Risk	Matri	x Likelihood					
A = Anticipated (L > 1.0E-02) U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{M}$ Moderate		II = situation (eve	· ·		T	A	U	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		7	vent) of minor concern	seou	Н	I	I	II	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L) Control(s) Type	С	N = Negligible Offsite (MOI)	Onsite	-2 (co-located worker)	vent) of minimal concern Onsite-1 (facility worker)	adner	M	II	II	III	IV		
	Н	C ≥ Irreversible,		rompt worker fatality	C ≥ Prompt worker	Consequences	L N	III IV	III IV	IV IV	IV IV		
Acronyms MOI = Maximally-exposed Offsite Individual		other serious effects, or symptoms which could impair an individual's ability to take protective action.	i	acute injury that is immediately life- tening or permanently disabling.	fatality or acute injury that is immediately life- threatening or permanently disabling.		1 - 1	1,	1,				
	M	C ≥ Mild, transient adverse effects.	imm per hosp	≥ Serious injury, no nediate loss of life no manent disabilities; pitalization required.	C ≥ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.								
	L	Mild, transient adverse effects > C		Minor injuries; no ospitalization > C	Minor injuries; no hospitalization > C								
	N	Consequences less than those for Low Consequence Level	Con	risequences less than for Low Consequence Level	Consequences less than those for Low Consequence Level								

Table 2.22 Access & Egress – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Life Safety Egress	Hazard: injury due to inability to exit	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1	Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.											
Likelihood (L, of event)/year	C	onsequence (C, of event)/y	year Risk (R, Qualitative	Risk (R, Qualitative Ranking)			Risk Matrix					
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$	I = situation (ever	nt) of major concern				Like	lihood			
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$	$\mathbf{H} = \text{situation (evolution (evolution)}$	ent) of concern			A	U	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low	III = situation (ex	vent) of minor concern	s	Н	I	I	II	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	vent) of minimal concern	ences	M	II	II	III	IV		
Control(s) Type	C	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sedno		***	***	***	***		
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C ≥ Prompt worker fatality	C ≥ Prompt worker	Cons	L	III	III	IV	IV		
M = Mitigative (reduces event consequences)		other serious effects,	or acute injury that is	fatality or acute injury that	0	N	IV	IV	IV	IV		
Acronyms		or symptoms which	immediately life-	is immediately life-				•	•			
MOI = Maximally-exposed Offsite Individual			threatening or permanently	threatening or								
		individual's ability to	disabling.	permanently disabling.								
		take protective	S									
		action.										
	M	C ≥ Mild, transient	C ≥ Serious injury, no	C ≥ Serious injury, no								
		adverse effects.	immediate loss of life no	immediate loss of life no								
			permanent disabilities;	permanent disabilities;								
			hospitalization required.	hospitalization required.								
	L	Mild, transient	Minor injuries; no	Minor injuries; no								
		adverse effects > C	hospitalization > C	hospitalization > C								
	N	Consequences less	Consequences less than	Consequences less than								
			those for Low Consequence	those for Low								
		Consequence Level	Level	Consequence Level								

Table 2.23 Access & Egress – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Life Safety Egress	Hazard: injury due to inability to exit	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1	Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.											
Likelihood (L, of event)/year	C	onsequence (C, of event)	year Risk (R, Qualitative	Risk (R, Qualitative Ranking)			Risk Matrix					
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$	I = situation (eve	ent) of major concern				Like	lihood			
U = Unlikely (1.0E-02 > L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$	II = situation (ev	ent) of concern			A	U	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low	III = situation (e	vent) of minor concern	S	Н	I	I	II	III		
BEU = Beyond Extremely Unlikely $(1.0E-06>L)$		N = Negligible	IV = situation (ev	vent) of minimal concern	ences	M	II	II	III	IV		
Control(s) Type	C	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbə	_	777	TTT	77.7	17.7		
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	C ≥ Prompt worker fatality	C ≥ Prompt worker	Cons	L	III	III	IV	IV		
M = Mitigative (reduces event consequences)		other serious effects,	or acute injury that is	fatality or acute injury that		N	IV	IV	IV	IV		
Acronyms		or symptoms which	immediately life-	is immediately life-			•	•	•			
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or permanently	threatening or								
		individual's ability to	disabling.	permanently disabling.								
		take protective	C									
		action.										
	M	$C \ge Mild$, transient	$C \ge$ Serious injury, no	C ≥ Serious injury, no								
		adverse effects.	immediate loss of life no	immediate loss of life no								
			permanent disabilities;	permanent disabilities;								
			hospitalization required.	hospitalization required.								
	L	Mild, transient	Minor injuries; no	Minor injuries; no								
		adverse effects > C	hospitalization $> C$	hospitalization > C								
	N	Consequences less	Consequences less than	Consequences less than								
		than those for Low	those for Low Consequence	those for Low								
		Consequence Level	Level	Consequence Level								

Table 2.24 Access & Egress – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Life Safety Egress	Hazard: N/A	L: A	See Section I Chapter 4	L: BEU
		C: H		C: M
		R: I		R: IV

Other Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.											
Likelihood (L, of event)/year	C	onsequence (C, of event)/	year Risk (R, Qualitative	Ranking)	Risk Matrix						
A = Anticipated (L > 1.0E-02)		$\mathbf{H} = \mathbf{High}$	I = situation (ever	nt) of major concern				Likelihood			
U = Unlikely (1.0E-02> L > 1.0E-04)		$\mathbf{M} = \mathbf{Moderate}$	$\mathbf{H} = \text{situation (evolution (evolution)}$	ent) of concern			Α	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L > 1.0E-06)		L = Low	III = situation (ev	vent) of minor concern	seou	Н	I	I	II	III	
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	vent) of minimal concern	enc	M	II	II	III	IV	
Control(s) Type	C	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nba	_					
P = Preventive (reduce event occurrence likelihood)	Н	C ≥ Irreversible,	$C \ge Prompt worker fatality$	C ≥ Prompt worker	Suc	L	III	III	IV	IV	
M = Mitigative (reduces event consequences)	•	other serious effects,	or acute injury that is	fatality or acute injury that	Coi	N	IV	IV	IV	IV	
Acronyms		or symptoms which	immediately life-	is immediately life-							
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or permanently	threatening or							
		individual's ability to	disabling.	permanently disabling.							
		take protective	disability.	permanently disabiling.							
		action.									
	M	C ≥ Mild, transient	C ≥ Serious injury, no	C ≥ Serious injury, no							
		adverse effects.	immediate loss of life no	immediate loss of life no							
			permanent disabilities;	permanent disabilities;							
			hospitalization required.	hospitalization required.							
	L	Mild, transient	Minor injuries; no	Minor injuries; no							
		adverse effects > C	hospitalization > C	hospitalization > C							
	N	Consequences less	Consequences less than	Consequences less than							
		than those for Low	those for Low Consequence	those for Low							
		Consequence Level	Level	Consequence Level							

Table 2.25 Environmental

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Airborne	Hazards: Airborne release of radionuclides beyond permitted limits. Discharge of chemicals into onsite surface waters beyond permitted limits.	L: C: R:	See Section I Chapter 4 See Section I Chapter 4	L: C: R:
Water	Hazards: Discharge of radionuclides into onsite surface waters beyond permitted limits. Discharge of chemicals into onsite surface waters beyond permitted limits.	L: C: R:	See Section I Chapter 4 See Section I Chapter 4	L: C: R:

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Soil	Hazards: Radioactive soil in beam loss areas beyond allowable concentrations of radionuclides beyond calculated Fermilab limits.	L: C: R:	Standard analysis applies	L: C: R:
	Discharge of chemicals into onsite soils beyond permitted limits.		Standard analysis applies	