	Risk Tables Description	Baseline Risk	Residual Risk
8.1	Radiological – Onsite-1 Facility Worker	R: I	R: III, IV
8.2	Radiological – Onsite-2 Co-located Worker	R: I	R: III, IV
8.3	Radiological – MOI Offsite	R: I	R: IV
8.4	Toxic Materials – Onsite 1 Facility Worker	R: NA*	R: NA*
8.5	Toxic Materials – Onsite 2 Co-located Worker	R: *	R: *
8.6	Toxic Materials – MOI Offsite	R: NA*	R: NA*
8.7	Flammable & Combustible Materials – Onsite-1 Facility Worker	R: *	R: *
8.8	Flammable & Combustible Materials – Onsite-2 Co-located worker	R: *	R: *
8.9	Flammable & Combustible Materials – MOI Offsite	R: NA*	R: NA*
8.10	Electrical Energy – Onsite-1 Facility Worker	R: *	R: *
8.11	Electrical Energy – Onsite-2 Co-located Worker	R: *	R: *
8.12	Electrical Energy – MOI Offsite	R: NA*	R: NA*
8.13	Thermal Energy – Onsite-1 Facility Worker	R: *	R: *
8.14	Thermal Energy – Onsite-2 Co-located Worker	R: *	R: *
8.15	Thermal Energy – MOI Offsite	R: NA*	R: NA*
8.16	Kinetic Energy – Onsite-1 Facility Worker	R: *	R: *
8.17	Kinetic Energy – Onsite-2 Co-located Worker	R: *	R: *
8.18	Kinetic Energy – MOI Offsite	R: NA*	R: NA*
8.19	Potential Energy- Onsite-1 Facility Worker	R: *	R: *
8.20	Potential Energy – Onsite-2 Co-located Worker	R: *	R: *
8.21	Potential Energy – MOI Offsite	R: NA*	R: NA*
8.22	Magnetic Fields – Onsite-1 Facility Worker	R: I	R: III
8.23	Magnetic Fields – Onsite-2 Co-located Worker	R: NA*	R: NA*
8.24	Magnetic Fields – MOI Offsite	R: NA*	R: NA*
8.25	Other Hazards – Onsite-1 Facility Worker	R: *	R: *
8.26	Other Hazards – Onsite-2 Co-located Worker	R: *	R: *
8.27	Other Hazards – MOI Offsite	R: NA*	R: NA*
8.28	Access & Egress – Onsite-1 Facility Worker	R: *	R: *
8.29	Access & Egress – Onsite-2 Co-located Worker	R: *	R: *
8.30	Access & Egress – MOI Offsite	R: NA*	R: NA*
8.31	Environmental Hazards	R: *	R: *

#### Table 8. Summary of Baseline and Residual Risks – Booster

\* 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 8.1 Radiological – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Prompt Ionizing Radiation	Exposure to ionizing radiation from klystrons	L: A	No analysis required	L: A
		C: L		C: L
		R: III		R: III
Residual	Hazard: Radiation exposure	L: A	M – Shielding to reduce activation	L: EU
Activation		С: Н	M – Proper dosimetry	C: L
		R: I	P – Employee Rad Worker training P – ALARA plan	R: IV
Groundwater	Hazard: Potential exposure due to	L: A	P – Sump water is evaluated to determine the presence of tritium or	L: EU
Activation	construction activities, (e.g.,	C: N	other activation products to prevent personnel exposure.	C: N
	earthmoving).	R: IV	<ul> <li>P – Lift stations capture potentially activated water to prevent releases exceeding allowed discharge limits.</li> <li>M – Facility designs employ shielding to mitigate the production of</li> </ul>	R: IV
			activation products in groundwater.	

Hazard	Hazard Hazard Description		Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Surface Water	Hazards:			
Activation	Potential exposure to activated surface water due to beam loss leakage from beam enclosures, located under the surface water impoundment.	L: A C: N R: IV	<ul> <li>P – Beam loss monitors (in enclosures) prevent excessive beam loss.</li> <li>M – Radiation Detectors (in enclosures and berms) reduce the amount of activation to surface water, by promptly disabling the beam.</li> <li>M – Shielding (soil, concrete, and/or steel) reduces surface water activation.</li> </ul>	L: U C: N R: IV
	Potential exposure to activated surface water due to mixing surface water with a captured groundwater source.	L: A C: N R: IV	<ul> <li>P – Off-site discharge limit is applied to any water mixed into onsite surface water. This prevents surface water concentrations from approaching the Derived Concentration Standard.</li> <li>P – Monitoring of potential mixed sources allow for diversion of water, preventing exposure to waters above the Derived Concentration Standard.</li> <li>M – In situations where surface water activation is higher than expected (discovered by monitoring), facility stops operation until facility upset condition is resolved.</li> <li>M – Frequent surface water monitoring at many locations to mitigate increases in activity approaching the Derived Concentration Standard.</li> </ul>	L: EU C: N R: IV
Radioactive	Hazard: Radiation exposure	L: A	M – Shielding to reduce generation of waste	L: EU
Waste		C: H R: I	<ul> <li>M – Material survey and release process</li> <li>P – Postings</li> <li>P – Beam tuned to reduce generation of waste</li> </ul>	C: L R: IV
Contamination	Hazard: Personnel exposure	L: A	M – Shielding to reduce activation	L: EU
	· · · · · · · · · · · · · · · · · · ·	С: Н	M – Proper PPE specified in RWP	C: L
		R: I	<ul> <li>P – Radiological controls personnel survey and decontamination</li> <li>P – Postings place in the event contamination is identified</li> </ul>	R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
<sup>7</sup> Be	Hazard: Uptake of <sup>7</sup> Be	L: A	Not applicable. No prevention or mitigation is required.	L: A
		C: N R: IV	<sup>7</sup> Be isn't hazardous in this pattern of use by facility.	C: N R: IV
Non-ionizing	Hazards:			
Radiation – Laser	Exposure to Class 3B and 4 lasers	L: A C: H R: I	<ul> <li>P – Class 1 (light tight) enclosures</li> <li>P – ORC and work planning processes</li> <li>P – Locked/Interlocked system</li> <li>P – LOTO procedure or other procedure approved by the LSO</li> <li>P – Affected areas are posted</li> <li>M – Use of PPE</li> </ul>	L: BEU C: M R: IV
	Exposure to Class 3R lasers	L: A C: L R: III	No analysis required	L: A C: L R: III
	Exposure to Class 1 and 2 Lasers	L: A C: N R: IV	No analysis required	L: A C: N R: IV
Non-ionizing	Hazard: Exposure from RF energy	L: A	P – RF Shielding	L: BEU
Radiation – RF	above allowed limits	C: M R: II	P – ES&H periodic monitoring P – LOTO procedure P – Affected area postings	C: M R: IV

Likelihood (L, of event)/year	Cor	sequence (C, of event)/y	ear	Risk (R, Qualitative Ra	nking)	Risk Matrix					
A = Anticipated (L > 1.0E-02)	H = High I = situation (event) of major concern					Like	lihood				
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (ever	nt) of concern		1	Α	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (eve	nt) of minor concern	ces	Н	1	I.	П	- 111
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (eve	nt) of minimal concern	ŝ	М	П	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsit	e-2 (co-located worker)	Onsite-1 (facility worker)	edne		ш	ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> 25.0 rem		<b>C</b> <sup>3</sup> 100 rem	<b>C</b> <sup>3</sup> 100 rem	Sons	-				
M = Mitigative (reduces event consequences)	м	25.0 rem > <b>C</b> <sup>3</sup> 5 rem	10	00 rem <b>&gt; C</b> <sup>3</sup> 25 rem	100 rem <b>&gt; C</b> <sup>3</sup> 25 rem		N	IV	IV	IV	IV
Acronyms	L	5 rem > <b>C</b>		25 rem <b>&gt; C</b>	25 rem <b>&gt; C</b>						
MOI = Maximally-exposed Offsite Individual rem = Roentgen equivalent man	Ν	0.5 rem > <b>C</b>		5 rem <b>&gt; C</b>	5 rem <b>&gt; C</b>						

# Table 8.2 Radiological – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Prompt Ionizing Radiation	Exposure to ionizing radiation from klystrons	L: A	No analysis required	L: A
		C: L		C: L
		R: III		R: III
Residual	Hazard: Radiation exposure	L: A	M – Shielding to reduce activation	L: EU
Activation		С: Н	M – Proper dosimetry	C: L
		R: I	P – Employee Rad Worker training P – ALARA plan	R: IV
Groundwater	Hazard: Potential exposure due to	L: A	P – Sump water is evaluated to determine the presence of tritium or	L: EU
Activation	construction activities, (e.g.,	C: N	other activation products to prevent personnel exposure.	C: N
	earthmoving).	R: IV	<ul> <li>P – Lift stations capture potentially activated water to prevent releases exceeding allowed discharge limits.</li> <li>M – Facility designs employ shielding to mitigate the production of activation products in groundwater.</li> </ul>	R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Surface Water	Hazards:			
Activation	Potential exposure to activated surface water due to beam loss leakage from beam enclosures, located under the surface water impoundment.	L: A C: N R: IV	<ul> <li>P – Beam loss monitors (in enclosures) prevent excessive beam loss.</li> <li>M – Radiation Detectors (in enclosures and berms) reduce the amount of activation to surface water, by promptly disabling the beam.</li> <li>M – Shielding (soil, concrete, and/or steel) reduces surface water activation.</li> </ul>	L: U C: N R: IV
	Potential exposure to activated surface water due to mixing surface water with a captured groundwater source.	L: A C: N R: IV	<ul> <li>P – Off-site discharge limit is applied to any water mixed into onsite surface water. This prevents surface water concentrations from approaching the Derived Concentration Standard.</li> <li>P – Monitoring of potential mixed sources allow for diversion of water, preventing exposure to waters above the Derived Concentration Standard.</li> <li>M – In situations where surface water activation is higher than expected (discovered by monitoring), facility stops operation until facility upset condition is resolved.</li> <li>M – Frequent surface water monitoring at many locations to mitigate increases in activity approaching the Derived Concentration Standard.</li> </ul>	L: EU C: N R: IV
Radioactive Waste	Hazard: Radiation exposure	L: A C: H R: I	M – Shielding to reduce generation of waste M – Material survey and release process P – Postings P – Beam tuned to reduce generation of waste	L: EU C: L R: IV

Hazard Hazard Description		Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Contamination	Hazard: Radiation exposure	L: A	M – Shielding to reduce activation	L: EU
		С: Н	M – Proper PPE specified in RWP	C: L
		R: I	<ul> <li>P – Radiological controls personnel survey and decontamination</li> <li>P – Postings place in the event contamination is identified</li> </ul>	R: IV
<sup>7</sup> Be	Hazard: Uptake of <sup>7</sup> Be	L: A	Not applicable. No prevention or mitigation is required.	L: A
		C: N	<sup>7</sup> Be isn't hazardous in this pattern of use by facility.	C: N
		R: IV		R: IV
Non-ionizing radiation-Laser	Hazards: Exposure to Class 3B and 4 lasers	L: A C: H R: I	<ul> <li>P —Class 1 (light tight) enclosures</li> <li>P – Locked/Interlocked system or administrative control approved by the LSO</li> <li>P – LOTO procedure or other procedure approved by the LSO</li> <li>P – Affected areas are posted</li> </ul>	L: BEU C: H R: IV L: A
	Exposure to Class 3R lasers	L: A C: L R: III	No analysis required	C: L R: III
	Exposure to Class 1 and 2 Lasers	L: A C: N R: IV	No analysis required	L: A C: N R: IV
Non-ionizing	Hazard: Exposure from RF energy	L: A	P – RF Shielding	L: BEU
radiation-RF	above allowed limits	C: M	P – ES&H periodic monitoring	C: M
		R: II	P – LOTO procedure performed by facility worker P – Affected area postings	R: IV

Likelihood (L, of event)/year	Con	sequence (C, of event)/y	vear	Risk (R, Qualitative Ra	nking)	Risk Matrix					
A = Anticipated (L > 1.0E-02)	H = High I = situation (event) of major concern		t) of major concern				Like	lihood			
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (even	it) of concern			Α	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (event) of minor concern		ces	Н	I	I	П	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (eve	nt) of minimal concern	en	М	Ш	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> 25.0 rem		<b>C</b> <sup>3</sup> 100 rem	<b>C</b> <sup>3</sup> 100 rem	Cons	_				
M = Mitigative (reduces event consequences)	м	25.0 rem > <b>C</b> <sup>3</sup> 5 rem	10	00 rem <b>&gt; C</b> <sup>3</sup> 25 rem	100 rem <b>&gt; C</b> <sup>3</sup> 25 rem		Ν	IV	IV	IV	IV
Acronyms	L	5 rem > <b>C</b>		25 rem <b>&gt; C</b>	25 rem <b>&gt; C</b>	1					
MOI = Maximally-exposed Offsite Individual rem = Roentgen equivalent man	N	0.5 rem > <b>C</b>		5 rem <b>&gt; C</b>	5 rem <b>&gt; C</b>						

# Table 8.3 Radiological – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Prompt Ionizing Radiation	Exposure to ionizing radiation from klystrons	L: N/A C: R:	Hazard does not apply to the public	L: N/A C: R:
Residual Activation	Hazard: Radiation exposure	L: N/A C: R:	Hazard does not apply to the public	L: N/A C: R:
Groundwater Activation	Hazard: Potential contamination of drinking water.	L: U C: N R: IV	<ul> <li>P – Monitoring groundwater near beam enclosures in the sump pit system to prevent release into downstream sources.</li> <li>P – monitoring wells (Class II groundwater) prevent exceeding limits imposed for tritium migration into Class I groundwater.</li> <li>P – Monitoring Class 1 water onsite to prevent exposure to public prior to releasing water to Class I offsite sources.</li> <li>M – Monitor Class 1 water to assure that activation products remain below allowed limits to public (non-degradation limit, State of Illinois).</li> </ul>	L: BEU C: N R: IV

Hazard Hazard Description		Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Surface Water Activation	Hazards: Potential exposure to activated surface water due to beam loss leakage from beam enclosures, located under the surface water impoundment.	L: A C: N R: IV	<ul> <li>P – Beam loss monitors (in enclosures) prevent excessive beam loss.</li> <li>M – Radiation Detectors (in enclosures and berms) reduce the amount of activation to surface water, by promptly disabling the beam.</li> <li>M – Shielding (soil, concrete, and/or steel) reduces surface water activation.</li> </ul>	L: U C: N R: IV
	Potential exposure to activated surface water due to mixing surface water with a captured groundwater source.	L: A C: N R: IV	<ul> <li>P – Off-site discharge limit is applied to any water mixed into onsite surface water. This prevents surface water concentrations from approaching the Derived Concentration Standard.</li> <li>P –Monitoring of potential mixed sources allow for diversion of water, preventing exposure to waters above the Derived Concentration Standard.</li> <li>M – In situations where surface water activation is higher than expected (discovered by monitoring), facility stops operation until facility upset condition is resolved.</li> <li>M – Frequent surface water monitoring at many locations to mitigate increases in activity approaching the Derived Concentration Standard.</li> </ul>	L: EU C: N R: IV
Radioactive Waste	Hazard: Radiation exposure	L: N/A C: R:	Hazard does not apply to the public	L: N/A C: R:
Contamination	Hazard: Radiation exposure	L: N/A C: R:	Hazard does not apply to the public	L: N/A C: R:
<sup>7</sup> Be	Hazard: Uptake of <sup>7</sup> Be	L: A C: N R: IV	Hazard does not apply to the public	L: A C: N R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Non-ionizing	Hazard: <mark>N/A</mark>	L:		L:
Radiation		C:		C:
Hazards		R:		R:

Likelihood (L, of event)/year	Cor	sequence (C, of event)/y	/ear	Risk (R, Qualitative Ranking)			Risk Matrix								
$\mathbf{A}$ = Anticipated (L > 1.0E-02)		H = High		I = situation (even	t) of major concern				Like	lihood					
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (ever	nt) of concern			Α	U	EU	BEU				
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		•	nt) of minor concern	ces	Н	I.	I.	ll –	- 111				
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (eve	ent) of minimal concern	enc	М	Ш	Ш	Ш	IV				
Control(s) Type	С	Offsite (MOI)	Onsit	e-2 (co-located worker)	Onsite-1 (facility worker)	equ	1	ш	ш	IV	IV				
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> 25.0 rem		<b>C</b> <sup>3</sup> 100 rem	<b>C</b> <sup>3</sup> 100 rem	Cons	-								
M = Mitigative (reduces event consequences)	м	25.0 rem > <b>C</b> <sup>3</sup> 5 rem	1(	00 rem <b>&gt; C</b> <sup>3</sup> 25 rem	100 rem <b>&gt; C</b> <sup>3</sup> 25 rem		Ν	IV	IV	IV	IV				
Acronyms	L	5 rem > <b>C</b>		25 rem <b>&gt; C</b>	25 rem <b>&gt; C</b>										
MOI = Maximally-exposed Offsite Individual rem = Roentgen equivalent man	Ν	0.5 rem > <b>C</b>		5 rem <b>&gt; C</b>	5 rem <b>&gt; C</b>	1									

# Table 8.4 Toxic Materials – Onsite 1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Lead		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Beryllium		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Chemical Hazard Consequences, derived from Figure C-	1, "Ex	kample Qualitative Cons	equend	ce Matrix", DOE-HDBK-	1163-2020.							
Likelihood (L, of event)/year	Со	nsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk Matrix						
A = Anticipated (L > 1.0E-02)		<b>H</b> = High		I = situation (even	I = situation (event) of major concern				Like	lihood		
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		1	A	U	EU	BEU	
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	es	Н	1	I	П	Ш	
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	equences	М	Ш	Ш	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	equ	1		ш	IV	IV	
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> PAC-2		<b>C</b> <sup>3</sup> PAC-3	C <sup>3</sup> IDLH	Cons	-					
M = Mitigative (reduces event consequences)	м	PAC-2 > <b>C</b> <sup>3</sup> PAC-1	F	PAC-3 > C <sup>3</sup> PAC-2	IDLH > C <sup>3</sup> PEL or TLV <sub>c</sub>		N	IV	IV	IV	IV	
Acronyms	L	PAC-1 > <b>C</b>		PAC-2 > <b>C</b>	PEL or TLV <sub>c</sub> > C							
IDLH = Immediately Dangerous to Life and Health MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit TLV <sub>c</sub> = Threshold Limit Value (ceiling)	N	Consequences less than those for Low Consequence Level		sequences less than for Low Consequence Level	Consequences less than those for Low Consequence Level							

#### Table 8.5 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		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Beryllium		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Chemical Hazard Consequences, derived from Figure C-	1, "Ex	kample Qualitative Cons	equenc	e Matrix", DOE-HDBK-	1163-2020.						
Likelihood (L, of event)/year	Со	nsequence (C, of event)	/year	Risk (R, Qualitative R	Risk (R, Qualitative Ranking)			(			
A = Anticipated (L > 1.0E-02)		<b>H</b> = High		I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		-	A	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (even	ent) of minor concern	es	Н	1	I.	II	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	ednences	М	Ш	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	sequ	1	ш	ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> PAC-2		<b>C</b> <sup>3</sup> PAC-3	C <sup>3</sup> IDLH	Cons					
M = Mitigative (reduces event consequences)	м	PAC-2 > <b>C</b> <sup>3</sup> PAC-1	F	PAC-3 > C <sup>3</sup> PAC-2	IDLH > C <sup>3</sup> PEL or TLV <sub>c</sub>		Ν	IV	IV	IV	IV
Acronyms	L	PAC-1 > <b>C</b>		PAC-2 > <b>C</b>	PEL or TLV <sub>c</sub> > C						
IDLH = Immediately Dangerous to Life and Health MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit TLV <sub>c</sub> = Threshold Limit Value (ceiling)	N	Consequences less than those for Low Consequence Level		sequences less than for Low Consequence Level	Consequences less than those for Low Consequence Level						

#### Table 8.6 Toxic Materials – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Lead		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Beryllium		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Со	nsequence (C, of event)	/year	Risk (R, Qualitative R	Qualitative Ranking)			Risk Matrix							
A = Anticipated (L > 1.0E-02)		H = High		I = situation (even	nt) of major concern				Like	lihood					
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern			Α	U	EU	BEU				
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	s	Н	1	I.	Ш	Ш				
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	equences	М	Ш	Ш	Ш	IV				
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	equ	1		ш	IV	IV				
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> PAC-2		<b>C</b> <sup>3</sup> PAC-3	C <sup>3</sup> IDLH	Cons					-				
M = Mitigative (reduces event consequences)	м	PAC-2 > <b>C</b> <sup>3</sup> PAC-1	F	PAC-3 > C <sup>3</sup> PAC-2	IDLH > C <sup>3</sup> PEL or TLV <sub>c</sub>		Ν	IV	IV	IV	IV				
Acronyms	L	PAC-1 > <b>C</b>		PAC-2 > <b>C</b>	PEL or TLV <sub>c</sub> > C										
IDLH = Immediately Dangerous to Life and Health MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit TLV <sub>c</sub> = Threshold Limit Value (ceiling)	N	Consequences less than those for Low Consequence Level		sequences less than for Low Consequence Level	Consequences less than those for Low Consequence Level										

# Table 8.7 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		L:	See Section I Chapter 04	L:
materials (cables,		C:		C:
Boxes, Paper,		R:		R:
wood cribbing,				
etc.)				
Flammable		L:	See Section I Chapter 04	L:
Materials		C:		C:
(Flammable gas,		R		R
cleaning				
materials, etc.)				

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve				А	U	EU	BE
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	sa	н	1	I.	Ш	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	Ш	IV	IV
<ul><li>P = Preventive (reduce event occurrence likelihood)</li><li>M = Mitigative (reduces event consequences)</li></ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	Consequences	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	м	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	Consequences less	Consequences less than	Consequences less than						
		than those for Low 1	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

#### Table 8.8 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		L:	See Section I Chapter 04	L:
materials (cables,		C:		C:
Boxes, Paper,		R:		R:
wood cribbing,				
etc.)				
Flammable		L:	See Section I Chapter 04	L:
Materials		C:		C:
(Flammable gas,		R		R
cleaning				
materials, etc.)				

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (ever	I = situation (event) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	н	1	- I	П	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suos	-				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	0	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	, , ,							
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	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 8.9 Flammable and Combustible Materials – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Combustible		L:	See Section I Chapter 04	L:
materials (cables,		C:		C:
Boxes, Paper,		R:		R:
wood cribbing,				
etc.)				
Flammable		L:	See Section I Chapter 04	L:
Materials		C:		C:
(Flammable gas,		R		R
cleaning				
materials, etc.)				

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative Ra	anking)	Risk	Matrix	1			
A = Anticipated (L > 1.0E-02)		H = High		nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	nt) of concern			Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (eve	ent) of minor concern	sa	н	1	- I	П	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	C <sup>3</sup> Prompt worker fatality	Suos	-				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	U	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	, , ,	. , ,						
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	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 8.10 Electrical Energy – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Stored Energy		L:	See Section I Chapter 04	L:
Exposure		C:		C:
		R:		R:
High Voltage		L:	See Section I Chapter 04	L:
Exposure		C:		C:
		R:		R:
Low Voltage, High		L:	See Section I Chapter 04	L:
Current Exposure.		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve			1	А	U	EU	BE
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	sa	н	1	I.	Ш	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	Ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> </ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	Consequences	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	permanently disubiling.	permanently usubling.						
		action.								
	м	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	Consequences less	Consequences less than	Consequences less than						
		than those for Low 1	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

# Table 8.11 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)
Stored Energy		L:	See Section I Chapter 04	L:
Exposure		C:		C:
		R:		R:
High Voltage		L:	See Section I Chapter 04	L:
Exposure		C:		C:
		R:		R:
Low Voltage, High		L:	See Section I Chapter 04	L:
Current Exposure.		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix	I			
A = Anticipated (L > 1.0E-02)		H = High		nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			Α	U	EU	BEL
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	н	1	- I	П	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suo	-				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	0	Ν	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	, , ,							
		action.								
	м	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	Consequences less	Consequences less than	Consequences less than						
		than those for Low 1	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

### Table 8.12 Electrical Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Stored Energy		L:	See Section I Chapter 04	L:
Exposure		C:		C:
		R:		R:
High Voltage		L:	See Section I Chapter 04	L:
Exposure		C:		C:
		R:		R:
Low Voltage, High		L:	See Section I Chapter 04	L:
Current Exposure.		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			А	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	н	1	1	П	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	П	П	Ш	١٧
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	ш	IV	IV
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suos					
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	0	Ν	IV	IV	IV	١V
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	, , ,							
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	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 8.13 Thermal Energy – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Magnet Bakeouts		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Hot work		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Cryogenics		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	nt) of concern			А	U	EU	BEI
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	Н	1	I.	Ш	- 111
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Π	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	nsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> <li>Acronyms</li> </ul>	Н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or symptoms which	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	Con	N	IV	IV	IV	IV
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an individual's ability to take protective action.	threatening or permanently disabling.	threatening or permanently disabling.						
	м	C <sup>3</sup> Mild, transient adverse effects.	<b>C</b> <sup>3</sup> Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.	C <sup>3</sup> Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.						
	L	Mild, transient adverse effects > <b>C</b>	Minor injuries; no hospitalization > <b>C</b>	Minor injuries; no hospitalization > <b>C</b>						
	Ν	Consequences less than those for Low t Consequence Level	Consequences less than hose for Low Consequence Level	Consequences less than those for Low Consequence Level						

# Table 8.14 Thermal Energy – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Magnet Bakeouts		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Hot work		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Cryogenics		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	nt) of concern			А	U	EU	BEI
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	Н	1	I.	Ш	- 111
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Π	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	nsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> <li>Acronyms</li> </ul>	Н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or symptoms which	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	Con	N	IV	IV	IV	IV
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an individual's ability to take protective action.	threatening or permanently disabling.	threatening or permanently disabling.						
	м	C <sup>3</sup> Mild, transient adverse effects.	<b>C</b> <sup>3</sup> Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.	C <sup>3</sup> Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.						
	L	Mild, transient adverse effects > <b>C</b>	Minor injuries; no hospitalization > <b>C</b>	Minor injuries; no hospitalization > <b>C</b>						
	Ν	Consequences less than those for Low t Consequence Level	Consequences less than hose for Low Consequence Level	Consequences less than those for Low Consequence Level						

# Table 8.15 Thermal Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Magnet Bakeouts		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Hot work		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Cryogenics		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	Risk (R, Qualitative Ranking) I = situation (event) of major concern II = situation (event) of concern III = situation (event) of minor concern IV = situation (event) of minimal concern		Risk Matrix					
A = Anticipated (L > 1.0E-02)		H = High						Likelihood			
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve				Α	U	EU	BEL	
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev			н	1	- I	П	- 111	
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev			М	П	П	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV	
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suos						
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	0	Ν	IV	IV	IV	IV	
Acronyms		symptoms which	immediately life-	immediately life-							
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or							
		individual's ability to	permanently disabling.	permanently disabling.							
		take protective	, , ,								
		action.									
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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							
	Ν	Consequences less	Consequences less than	Consequences less than							
		than those for Low 1	hose for Low Consequence	those for Low							
		Consequence Level	Level	Consequence Level							

Table 8.16 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		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Motion Tables		L:	See Section I Chapter 04	L:
MOLIOIT TADIES		C:		C:
		R:		R:
Pumps and		L:	See Section I Chapter 04	L:
Motors		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear   Risk (R, Qualitative Ra	Risk (R, Qualitative Ranking) I = situation (event) of major concern II = situation (event) of concern III = situation (event) of minor concern IV = situation (event) of minimal concern		Risk Matrix					
A = Anticipated (L > 1.0E-02)		H = High						Likelihood			
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve				А	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (eve			н	1	- I	П	- 111	
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev			М	Ш	П	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV	
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suos	-					
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	0	N	IV	IV	IV	IV	
Acronyms		symptoms which	immediately life-	immediately life-							
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or							
		individual's ability to	permanently disabling.	permanently disabling.							
		take protective	, , ,								
		action.									
	М	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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							
	Ν	Consequences less	Consequences less than	Consequences less than							
		than those for Low 1	hose for Low Consequence	those for Low							
		Consequence Level	Level	Consequence Level							

#### Table 8.17 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		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Motion Tables		L:	See Section I Chapter 04	L:
MOLIOIT TADIES		C:		C:
		R:		R:
Pumps and		L:	See Section I Chapter 04	L:
Motors		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	year	Risk (R, Qualitative Ra	anking)	Risk	Matri	x	(							
A = Anticipated (L > 1.0E-02)		<b>H</b> = High		I = situation (ever	situation (event) of major concern				Like	lihood						
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern			A	U	EU	BEU					
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	ces	Н	1	1	Ш	III					
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	nenc	М	П	П	Ш	IV					
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	sequ	L	ш	ш	IV	IV					
<ul><li>P = Preventive (reduce event occurrence likelihood)</li><li>M = Mitigative (reduces event consequences)</li></ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or		ompt worker fatality cute injury that is	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	Cons	N	IV	IV	IV	IV					
Acronyms MOI = Maximally-exposed Offsite Individual		symptoms which could impair an	im t	nmediately life- threatening or	immediately life- threatening or											
		individual's ability to take protective action.	perm	nanently disabling.	permanently disabling.											
	м	C <sup>3</sup> Mild, transient		Serious injury, no	C <sup>3</sup> Serious injury, no											
		adverse effects.	-	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											

### Table 8.18 Kinetic Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Power tools		L:	See Section I Chapter 04	L:
Power tools		C:		C:
		R:		R:
Motion Tables		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Pumps and		L:	See Section I Chapter 04	L:
Motors		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "		•		-												
Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	year	Risk (R, Qualitative Ra	anking)	Risk	Matr	ix	د							
A = Anticipated (L > 1.0E-02)		<b>H</b> = High		I = situation (ever	nt) of major concern				Likelihood							
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		<del>1</del>	A	U	EU	BEU					
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (even	ent) of minor concern	es	Н	I.	1	П	Ш					
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	nence	М	П	П	- 111	IV					
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	seq	L	ш	ш	IV	IV					
<b>P</b> = Preventive (reduce event occurrence likelihood)	Н	C <sup>3</sup> Irreversible, other	C <sup>3</sup> Pro	ompt worker fatality	C <sup>3</sup> Prompt worker fatality	Con	<u> </u>									
M = Mitigative (reduces event consequences)		serious effects, or	or ad	cute injury that is	or acute injury that is	_	Ν	IV	IV	IV	IV					
Acronyms		symptoms which	im	nmediately life-	immediately life-											
MOI = Maximally-exposed Offsite Individual		could impair an	t	threatening or	threatening or											
		individual's ability to	perm	nanently disabling.	permanently disabling.											
		take protective														
		action.														
	М	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> S	Serious injury, no	C <sup>3</sup> Serious injury, no											
		adverse effects.	imme	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	ho	spitalization > C	hospitalization > C											

# Table 8.19 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		L: C: R:	See Section I Chapter 04	L: C: R:
Compressed Gasses		L: C: R:	See Section I Chapter 04	L: C: R:
Vacuum/ Pressure Vessels/Piping		L: C: R:	See Section I Chapter 04	L: C: R:
Vacuum Pumps		L: C: R:	See Section I Chapter 04	L: C: R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix	:			
A = Anticipated (L > 1.0E-02)		<b>H</b> = High		nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve				Α	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	•	ent) of minor concern	S	н	1	1	П	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	ence	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences			Ш	IV	IV
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	<b>C</b> <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suo	L				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	0	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	, ,							
		action.								
	м	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	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 8.20 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		L: C: R:	See Section I Chapter 04	L: C: R:
Compressed Gasses		L: C: R:	See Section I Chapter 04	L: C: R:
Vacuum/ Pressure Vessels/Piping		L: C: R:	See Section I Chapter 04	L: C: R:
Vacuum Pumps		L: C: R:	See Section I Chapter 04	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	nce Matrix", DOE-HDBK-116	53-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		<b>H</b> = High	I = situation (eve	nt) of major concern					lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern	-		A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	se	Н	I.	I.	П	Ш
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	П	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	L	ш	ш	IV	IV
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	C <sup>3</sup> Irreversible, other	C <sup>3</sup> Prompt worker fatality	C <sup>3</sup> Prompt worker fatality	Con		D /			
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is		N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	C <sup>3</sup> 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						
	Ν	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 8.21 Potential Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Crane Operations		L: C: R:	See Section I Chapter 04	L: C: R:
Compressed Gasses		L: C: R:	See Section I Chapter 04	L: C: R:
Vacuum/ Pressure Vessels/Piping		L: C: R:	See Section I Chapter 04	L: C: R:
Vacuum Pumps		L: C: R:	See Section I Chapter 04	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	nce Matrix", DOE-HDBK-116	3-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			A	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	s	Н	I	I	II	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	ienc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	L	ш	Ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> <li>Acronyms</li> <li>MOI = Maximally-exposed Offsite Individual</li> </ul>	Η	C <sup>3</sup> Irreversible, other serious effects, or symptoms which could impair an	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life- threatening or	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life- threatening or	Con	N	IV	IV	IV	IV
		individual's ability to take protective action.	permanently disabling.	permanently disabling.						
	М	C <sup>3</sup> Mild, transient adverse effects.	<b>C</b> <sup>3</sup> Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.	C <sup>3</sup> Serious injury, no immediate loss of life no permanent disabilities; hospitalization required.						
	L	Mild, transient adverse effects > <b>C</b>	Minor injuries; no hospitalization <b>&gt; C</b>	Minor injuries; no hospitalization <b>&gt; C</b>						
	Ν	Consequences less than those for Low t Consequence Level	Consequences less than hose for Low Consequence Level	Consequences less than those for Low Consequence Level						

#### Table 8.22 Magnetic Fields – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Fringe Fields		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	nce Matrix", DOE-HDBK-116	3-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative Ra	anking)	Risk	Matrix	(			
A = Anticipated (L > 1.0E-02)		<b>H</b> = High	I = situation (ever	I = situation (event) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			A	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (eve	ent) of minor concern	es	Н	1	1	Ш	Ш
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	П	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	I	ш	ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C <sup>3</sup> Irreversible, other	C <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Con	-				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	U	Ν	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	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 8.23 Magnetic Fields – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Fringe Fields		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		<b>H</b> = High		nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	Н	1	I.	Ш	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	Ш	IV	IV
<b>P</b> = Preventive (reduce event occurrence likelihood)	н	C <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality	<b>C</b> <sup>3</sup> Prompt worker fatality	Suo	_				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	U	Ν	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	Ν	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 8.24 Magnetic Fields – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Fringe Fields	L:		L:	
	C:		C:	
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year Risk (R, Qualitative F	Ranking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		<b>H</b> = High	I = situation (eve	ent) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (ev	ent) of concern		1	A	U	EU	BEU
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	vent) of minor concern	es	Н	1	1	П	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (e	vent) of minimal concern	enc	М	П	П	ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequences	1	ш	ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	<b>C</b> <sup>3</sup> Irreversible, other	C <sup>3</sup> Prompt worker fatality	C <sup>3</sup> Prompt worker fatality	Succession	-				
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is		Ν	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	C <sup>3</sup> 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	1					
		adverse effects > C	hospitalization > C	hospitalization > C						
	Ν	Consequences less	Consequences less than	Consequences less than	1					
		than those for Low	those for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

Table 8.25 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		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Noise		L:	See Section I Chapter 04	L:
		C:		C:
		R		R:
Silica		L:	See Section I Chapter 04	L:
		C:		C:
		R		R:
Ergonomics		L:	See Section I Chapter 04	L:
		C:		C:
		R		R:
Asbestos		L:	See Section I Chapter 04	L:
		C:		C:
		R		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (ever	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve			1	А	U	EU	BE
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	sa	н	1	I.	Ш	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> </ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	Consequences	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
, ,		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	permanentiy disabiling.	permanentiy usabiling.						
		action.								
	м	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	1	adverse effects > C	hospitalization > C	hospitalization > C						
	Ν	Consequences less	Consequences less than	Consequences less than						
	1	than those for Low	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

Table 8.26 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		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Noise		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Silica		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Ergonomics		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Asbestos		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (ever	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve			1	А	U	EU	BE
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	sa	н	1	I.	Ш	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> </ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	Consequences	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
, ,		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	permanentiy disabiling.	permanentiy usabiling.						
		action.								
	м	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	1	adverse effects > C	hospitalization > C	hospitalization > C						
	Ν	Consequences less	Consequences less than	Consequences less than						
	1	than those for Low	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

#### Table 8.27 Other hazards – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Confined Spaces		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Noise		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Silica		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Ergonomics		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Asbestos		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (ever	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve			1	А	U	EU	BE
<b>EU</b> = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	sa	н	1	I.	Ш	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> </ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	<b>C</b> <sup>3</sup> Prompt worker fatality or acute injury that is	Consequences	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
, ,		individual's ability to	permanently disabling.	permanently disabling.						
		take protective	permanentiy disabiling.	permanentiy usabiling.						
		action.								
	м	C <sup>3</sup> Mild, transient	<b>C</b> <sup>3</sup> Serious injury, no	<b>C</b> <sup>3</sup> 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						
	1	adverse effects > C	hospitalization > C	hospitalization > C						
	Ν	Consequences less	Consequences less than	Consequences less than						
	1	than those for Low	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

# Table 8.28 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:	L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event)/y	ear Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		<b>H</b> = High	I = situation (even	nt) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern			А	U	EU	BE
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	es	Н	1	Ι	Ш	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		ent) of minimal concern	enc	М	Π	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	ш	Ш	IV	IV
<ul> <li>P = Preventive (reduce event occurrence likelihood)</li> <li>M = Mitigative (reduces event consequences)</li> <li>Acronyms</li> </ul>	н	<b>C</b> <sup>3</sup> Irreversible, other serious effects, or symptoms which	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	Consequences	N	IV	IV	IV	IV
<b>MOI =</b> Maximally-exposed Offsite Individual		could impair an individual's ability to	threatening or permanently disabling.	threatening or permanently disabling.						
		take protective action.	, , ,	, , ,						
	м	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	C <sup>3</sup> 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						
	Ν	Consequences less	Consequences less than	Consequences less than						
		than those for Low	hose for Low Consequence	those for Low						
		Consequence Level	Level	Consequence Level						

### Table 8.29 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		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year		onsequence (C, of event)/y	ear Risk (R, Qualitative R	Risk (R, Qualitative Ranking)		Matri	x			
A = Anticipated (L > 1.0E-02)		<b>H</b> = High	I = situation (eve	I = situation (event) of major concern				Like	lihood	
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern		1	A	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	ces	Н	1	I.	П	- 111
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	lenc	М	П	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sedu	L	ш	ш	IV	IV
<ul><li>P = Preventive (reduce event occurrence likelihood)</li><li>M = Mitigative (reduces event consequences)</li><li>Acronyms</li></ul>		C <sup>3</sup> Irreversible, other	C <sup>3</sup> Prompt worker fatality	C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	Con					
		serious effects, or	or acute injury that is			Ν	IV	IV	IV	IV
		symptoms which	immediately life-							
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	C <sup>3</sup> 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						

Ν	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 8.30 Access & Egress – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Life Safety Egress		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:

Likelihood (L, of event)/year		onsequence (C, of event)/y	ear   Risk (R, Qualitative R	Risk (R, Qualitative Ranking)		Matri	۲ <u>ــــــــــــــــــــــــــــــــــــ</u>			
A = Anticipated (L > 1.0E-02)		H = High I = situation (even		nt) of major concern				Likelihood		
<b>U</b> = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	= situation (event) of concern		1	А	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	III = situation (event) of minor concern		Н	1	1	- II	Ш
<b>BEU</b> = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	IV = situation (event) of minimal concern		М	П	Ш	Ш	IV
Control(s) Type P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual		Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker) C <sup>3</sup> Prompt worker fatality or acute injury that is immediately life-	sedu	L	ш	ш	IV	IV
		C <sup>3</sup> Irreversible, other	<b>C</b> <sup>3</sup> Prompt worker fatality		Con					
		serious effects, or	or acute injury that is		•	Ν	IV	IV	IV	IV
		symptoms which	immediately life-							
		could impair an	threatening or	threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C <sup>3</sup> Mild, transient	C <sup>3</sup> Serious injury, no	C <sup>3</sup> 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	Conse	quences less	Consequences less than	Consequences less than	
	than th	nose for Low	those for Low Consequence	those for Low	
	Consec	quence Level	Level	Consequence Level	

Table 8.31 Environmental

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Airborne		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Water		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Soil		L:	See Section I Chapter 04	L:
		C:		C:
		R:		R: