Table 13. Summary of Baseline and Residual Risks Meson

	Risk Tables Description	Baseline Risk	Residual Risk
13,1	Radiological – Onsite-1 Facility Worker	R: I	R: IV
13.2	Radiological – Onsite-2 Co-located Worker	R: I	R: IV
13.3	Radiological – MOI Offsite	R: I	R: III
13.4*	Toxic Materials – Onsite 1 Facility Worker	R: *	R: *
13.5*	Toxic Materials – Onsite 2 Co-located Worker	R: *	R: *
13.6*	Toxic Materials – MOI Offsite	R: *	R: *
13.7*	Flammable & Combustible Materials – Onsite-1 Facility Worker	R: *	R: *
13.8*	Flammable & Combustible Materials – Onsite-2 Co-located	R: *	R: *
	worker		
13.9*	Flammable & Combustible Materials – MOI Offsite	R: *	R: *
13.10*	Electrical Energy – Onsite-1 Facility Worker	R: *	R: *
13.11*	Electrical Energy – Onsite-2 Co-located Worker	R: *	R: *
13.12*	Electrical Energy – MOI Offsite	R: *	R: *
13.13*	Thermal Energy – Onsite-1 Facility Worker	R: *	R: *
13.14*	Thermal Energy – Onsite-2 Co-located Worker	R: *	R: *
13.15*	Thermal Energy – MOI Offsite	R: *	R: *
13.16*	Kinetic Energy – Onsite-1 Facility Worker	R: *	R: *
13.17*	Kinetic Energy – Onsite-2 Co-located Worker	R: *	R: *
13.18*	Kinetic Energy – MOI Offsite	R: *	R: *
13.19*	Potential Energy - Onsite-1 Facility Worker	R: *	R: *
13.20*	Potential Energy – Onsite-2 Co-located Worker	R: *	R: *
13.21*	Potential Energy – MOI Offsite	R: *	R: *
13.22*	Magnetic Fields – Onsite-1 Facility Worker	R: *	R: *
13.23*	Magnetic Fields – Onsite-2 Co-located Worker	R: *	R: *
13.24*	Magnetic Fields – MOI Offsite	R: *	R: *
13.25	Other Hazards – Onsite-1 Facility Worker	R: I	R: IV
13.26	Other Hazards – Onsite-2 Co-located Worker	R: III	R: III
13.27	Other Hazards – MOI Offsite	R: III	R: III
13.28*	Access & Egress – Onsite-1 Facility Worker	R: *	R: *
13.29*	Access & Egress – Onsite-2 Co-located Worker	R: *	R: *
13.30*	Access & Egress – MOI Offsite	R: *	R: *
13.31*	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 13.1 Radiological – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Residual	Hazard: Exposure to residual	L: A	P: Radiological Work Permit prevents unauthorized personnel form areas	L: BEU
activation	activation.	C: H	where excessive residual radiation exists.	C: L
		R: I	 P: Postings intended to caution workers of area hazard. P: Training for workers to identify and respond to the hazard. M: Run Conditions to ensure total radiation levels are within expected parameters. M: Shielding increases distance from the source of residual activation, minimizing exposure. 	R: IV
Groundwater	Hazard: Radionuclides in groundwater	L: A	P: Sump Pumps ensure water does not remain in the enclosure for	L: BEU
Activation	exceeding regulatory levels.	C: H	extended periods of time.	C: M
		R: I	P: Sump Monitoring Program samples the water discharged by the sump pumps.P: Sump Pump Hatches are locked.M: Run Conditions to ensure total radiation levels are within expected parameters.	R: IV
Surface Water	Hazard: Radionuclides in surface	L: A	P: Sump Pumps ensure water does not remain in the enclosure for	L: EU
Activation	water exceeding regulatory levels.	C: H	extended periods of time.	C: L
		R: I	 P: Sump Monitoring Program samples the water discharged by the sump pumps. M: Run Conditions to ensure total radiation levels are within expected parameters. M: Shielding ensures the distance from source to surface is maximized to reduce total dose. 	R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Radioactive	Hazard: Personnel exposed to	L: A	P: Postings intended to caution workers of area hazard.	L: BEU
Water (RAW)	radioactive water exceeding	C: H	P: Radiological Work Permit prevents unauthorized personnel form areas	C: M
Systems	regulatory levels.	R: I	where excessive residual radiation exists.	R: IV
			P: Training for workers to identify and respond to the hazard.	
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
Air Activation	Hazard: Radionuclides in air exceeding	L: A	P: Measured air release documented in 2003 Shielding Assessment for the	L: U
	regulatory levels.	C: N	Switchyard 120 Project indicated 0 Ci per year under similar beam	C: N
		R: IV	conditions.	R: IV
			M: Engineered Air Flow ensures the air activation remains within the	
			enclosure for more than the half-life of radionuclides before exiting.	
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
Soil Interactions	Hazard: Radionuclides are produced,	L: A	P: No excavation work allowed without an RWP.	L: U
	which may contaminate groundwater.	C: H	M: Engineered Beam Dump designed to contain the radiation produced by	C: N
		R: I	absorbing the deposited energy.	R: IV
			M: Beamline Design ensures beam is transported through areas without interacting with soil.	
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
Radioactive	Hazard: Personnel are exposed to	L: A	P: Locked Gates prevent access to areas where radiation waste is stored.	L: BEU
waste	ionizing radiation beyond regulatory	C: H	P: Key Control Program ensures access to these areas is managed.	C: N
	levels.	R: I	P: Postings intended to caution workers of area hazard.	R: IV
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
			M: Distance to Stored Materials reduces total exposure risk to personnel.	
			M: Material survey and release program ensures radioactive waste is not stored in unauthorized areas.	

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Contamination	Hazard: Personnel are exposed to	L: A	P: Radiation Survey of areas to measure and detect contamination	L: EU
	ionizing radiation beyond regulatory	C: H	hazards.	C: L
	levels.	R: I	P: Postings intended to caution workers of area hazard.	R: IV
			M: PPE Specified by the RWP to protect workers in a contamination area.	
			M: Training to ensure workers understand the risks and can prepare for the job accordingly.	
⁷ Be	Hazard: Potential radiation exposure	L: A	⁷ Be isn't hazardous in this pattern of use by facility.	L: A
	to ⁷ Be (uptake/committed dose).	C: N		C: N
		R: IV		R: IV
Radioactive	Hazard: Personnel are exposed to	L: A	P: Training for workers to identify and respond to the hazard.	L: EU
Sources	ionizing radiation beyond regulatory	C: H	P: Postings intended to caution workers of area hazard.	C: L
	levels.	R: I	M: Source Handling Storage Requirements ensure radioactive sources are secured when not in use.	R: IV
			M: Source Handling "In-Use" Requirements ensure the area where the radioactive source is used is tightly controlled.	

Radiological Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.									
Likelihood (L, of event)/year	Consequence (C, of event)/year Risk (R, Qualitative Ranking)		Dist. Market						
A = Anticipated (L > 1.0E-02)	H = High I = situation (event) of major concern		Risk Matrix		Liko	ihood			
U = Unlikely (1.0E-02> L >1.0E-04)	M = Moderate	II = situation (event) of concern		Δ	LIKE!	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)	L = Low	III = situation (event) of minor concern	U d H	1	ī	II	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)	N = Negligible	IV = situation (event) of minimal concern		,	'	"			

Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)		М	П	Ш	III	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ 25.0 rem	C ³ 100 rem	C ³ 100 rem			Ш	111	IV	IV
M = Mitigative (reduces event consequences)		25.0 rem > C ³ 5 rem	100 rem > C 3 25 rem	100 rem > C ³ 25 rem	, -		***	111		
Acronyms	L	5 rem > C	25 rem > C	25 rem > C		N	IV	IV	IV	IV
MOI = Maximally-exposed Offsite Individual rem = Roentgen equivalent man	N	0.5 rem > C	5 rem > C	5 rem > C						

Table 13.2 Radiological – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Residual	Hazard: Exposure to residual	L: A	P: Radiological Work Permit prevents unauthorized personnel form areas	L: BEU
activation	activation.	C: H	where excessive residual radiation exists.	C: L
		R: I	 P: Postings intended to caution workers of areas of residual activation. P: Training for workers to identify and respond to the hazard. M: Run Conditions to ensure total radiation levels are within expected parameters. M: Shielding increases distance from the source of residual activation, minimizing exposure. 	R: IV
Groundwater	Hazard: Radionuclides in groundwater	L: A	P: Sump Pumps ensure water does not remain in the enclosure for	L: BEU
Activation	exceeding regulatory levels.	C: H	extended periods of time.	C: M
		R: I	P: Sump Monitoring Program samples the water discharged by the sump pumps.P: Sump Pump pit workers inform co-located workers of hazard.M: Run Conditions to ensure total radiation levels are within expected parameters.	R: IV
Surface Water	Hazard: Radionuclides in surface	L: A	P: Sump Pumps ensure water does not remain in the enclosure for	L: EU
Activation	water exceeding regulatory levels.	C: H	extended periods of time.	C: L
		R: I	 P: Sump Monitoring Program samples the water discharged by the sump pumps. M: Run Conditions to ensure total radiation levels are within expected parameters. M: Shielding ensures the distance from source to surface is maximized to reduce total dose. 	R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Radioactive	Hazard: Personnel exposed to	L: A	P: Postings to caution workers of area hazard.	L: BEU
Water (RAW)	radioactive water exceeding	C: H	P: Radiological Work Permit prevents unauthorized personnel form areas	C: M
Systems	regulatory levels.	R: I	where excessive residual radiation exists.	R: IV
			P: Training for workers to identify and respond to the hazard.	
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
Air Activation	Hazard: Radionuclides in air exceeding	L: A	P: Measured air release documented in 2003 Shielding Assessment for the	L: U
	regulatory levels.	C: N	Switchyard 120 Project indicated 0 Ci per year under similar beam	C: N
		R: IV	conditions.	R: IV
			M: Engineered Air Flow ensures the air activation remains within the	
			enclosure for more than the half-life of radionuclides before exiting.	
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
Soil Interactions	Hazard: Radionuclides are produced,	L: A	P: No excavation work allowed without an RWP.	L: U
	which may contaminate groundwater	C: H	M: Engineered Beam Dump designed to contain the radiation produced by	C: N
		R: I	absorbing the deposited energy.	R: IV
			M: Beamline Design ensures beam is transported through areas without interacting with soil.	
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
Radioactive	Hazard: Personnel are exposed to	L: A	P: Locked Gates prevent access to areas where radioactive waste is stored.	L: BEU
waste	ionizing radiation beyond regulatory	C: H	P: Key Control Program ensures access to these areas is managed.	C: N
	levels.	R: I	P: Postings intended to caution workers of area hazard.	R: IV
			M: Run Conditions to ensure total radiation levels are within expected parameters.	
			M: Distance to Stored Materials reduces total exposure risk to personnel.	
			M: Material survey and release program ensures radioactive waste is not stored in unauthorized areas.	

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Contamination	Hazard: Personnel are exposed to	L: A	P: Radiation Survey of areas to measure and detect contamination	L: EU
	ionizing radiation beyond regulatory	C: H	hazards.	C: L
	levels.	R: I	P: Postings intended to caution workers of area hazard.	R: IV
			M: PPE Specified by the RWP to protect workers in a contamination area.	
			M: Training to ensure workers understand the risks and can prepare for	
			the job accordingly.	
⁷ Be	Hazard: Potential radiation exposure	L: A	⁷ Be isn't hazardous in this pattern of use by facility.	L: A
	to ⁷ Be (uptake/committed dose).	C: N		C: N
		R: IV		R: IV
Radioactive	Hazard: Personnel are exposed to	L: A	P: Training for workers to identify and respond to the hazard.	L: EU
Sources	ionizing radiation beyond regulatory	C: H	P: Postings intended to caution workers of area hazard.	C: L
	levels.	R: I	M: Source Handling Storage Requirements ensure radioactive sources are	R: IV
			secured when not in use.	
			M: Source Handling "In-Use" Requirements ensure the area where the	
			radioactive source is used is tightly controlled.	

Radiological Hazard Consequences, derived from Figure C-1, "Example Qualitative Consequence Matrix", DOE-HDBK-1163-2020.									
Likelihood (L, of event)/year	Consequence (C, of event)/year Risk (R, Qualitative Ranking)		Dist Market						
A = Anticipated (L > 1.0E-02)	H = High I = situation (event) of major concern		Risk Matrix		Liko	ihood			
U = Unlikely (1.0E-02> L >1.0E-04)	M = Moderate	II = situation (event) of concern		Δ	II.	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)	L = Low	III = situation (event) of minor concern	Оф	,	ı	II	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)	N = Negligible	IV = situation (event) of minimal concern			•	"			

Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	М	Ш	Ш	
P = Preventive (reduce event occurrence likelihood)	Н	C ³ 25.0 rem	C ³ 100 rem	C ³ 100 rem	1	Ш	Ш	Γ
M = Mitigative (reduces event consequences)	М	25.0 rem > C ³ 5 rem	100 rem > C ³ 25 rem	100 rem > C ³ 25 rem				-
Acronyms	L	5 rem > C	25 rem > C	25 rem > C	N	IV	IV	
MOI = Maximally-exposed Offsite Individual	N	0.5 rem > C	5 rem > C	5 rem > C				
rem = Roentgen equivalent man								

IV

IV

IV

IV

IV

Table 13.3 Radiological – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Residual	Hazard: Exposure to residual	L: A	P: Locked building prevents unauthorized access by public.	L: EU
activation	activation.	C: H	P: Locked enclosure prevents unauthorized access by public.	C: M
		R: I	M: Run Conditions limit total beam through the area to limit the creation of activation.	R: III
Groundwater	Hazard: Radionuclides in groundwater	L: A	P: Sump Pumps ensure water does not remain in the enclosure for	L: EU
Activation	exceeding regulatory levels.	C: H	extended periods of time.	C: M
		R: I	P: Sump Monitoring Program samples the water discharged by the sump pumps. M: Run Conditions to ensure total radiation levels are within expected parameters.	R: III
Surface Water	Hazard: Radionuclides in surface	L: A	P: Sump Pumps ensure water does not remain in the enclosure for	L: EU
Activation	water exceeding regulatory levels.	C: H	extended periods of time.	C: L
		R: I	 P: Sump Monitoring Program samples the water discharged by the sump pumps. M: Run Conditions to ensure total radiation levels are within expected parameters. M: Shielding ensures the distance from source to surface is maximized to reduce total dose. 	R: IV
Radioactive	Hazard: Personnel exposed to	L: A	P: Locked building prevents unauthorized access by public.	L: EU
Water (RAW)	radioactive water exceeding	C: H	P: Locked enclosure gate prevents access to the RAW system.	C: M
Systems	regulatory levels.	R: I	M: Run Conditions limit total beam through the area to limit the creation of activation.	R: III

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Air Activation	Hazard: Radionuclides in air exceeding regulatory levels.	L: A C: N R: IV	 P: Measured air release documented in 2003 Shielding Assessment for the Switchyard 120 Project indicated 0 Ci per year under similar beam conditions. M: Engineered Air Flow ensures the air activation remains within the enclosure for more than the half-life of radionuclides before exiting. M: Run Conditions to ensure total radiation levels are within expected parameters. 	L: U C: N R: IV
Soil Interactions	Hazard: Radionuclides are produced, which may contaminate the soil.	L: A C: H R: I	 M: Engineered Beam Dump designed to contain the radiation produced by absorbing the deposited energy. M: Beamline Design ensures beam is transported through areas without interacting with soil. M: Run Conditions to ensure total radiation levels are within expected parameters. 	L: A C: N R: IV
Radioactive waste	Hazard: Personnel are exposed to ionizing radiation beyond regulatory levels.	L: A C: H R: I	P: Locked Gates prevent access to areas where radiation waste is stored. P: Key Control Program ensures access to these areas is managed. M: Run Conditions to ensure total radiation levels are within expected parameters. M: Distance to Stored Materials reduces total exposure. M: Material survey and release program ensures radioactive waste is not stored in unauthorized areas.	L: EU C: N R: IV
Contamination	Hazard: Personnel are exposed to ionizing radiation beyond regulatory levels.	L: A C: H R: I	P: Locked building prevents unauthorized access by public. P: Locked enclosure prevents unauthorized access by public. M: Shielding increases distance to stored materials reduces total exposure. M: Material survey and release program ensures radioactive waste is not stored in unauthorized areas.	L: EU C: L R: IV

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
⁷ Be	Hazard: Potential radiation exposure	L: A	⁷ Be isn't hazardous in this pattern of use by facility.	L: A
	to 7Be (uptake/committed dose).	C: N		C: N
		R: IV		R: IV
Radioactive	Hazard: Personnel are exposed to	L: A	P: Locked building prevents unauthorized access by public.	L: EU
Sources	ionizing radiation beyond regulatory	C: H	P: Sources locked and inventoried by ES&H always ensuring positive	C: L
	levels.	R: I	control of radioactive source.	R: IV
			M: Source Handling Storage Requirements ensure radioactive sources are	
			secured when not in use.	
			M: Source Handling "In-Use" Requirements ensure the area where the	
			radioactive source is used is tightly controlled.	

Likelihood (L, of event)/year	Cor	Consequence (C, of event)/year R		Risk (R, Qualitative Ra	Risk (R, Qualitative Ranking)							
A = Anticipated (L > 1.0E-02)		H = High		I = situation (event) of major concern					Likel	ihood		
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (even	it) of concern			Α	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ever	III = situation (event) of minor concern		Н	- 1	- 1	Ш	III	
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (event) of minimal concern		lenc	М	П	Ш	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsit	te-2 (co-located worker)	Onsite-1 (facility worker)	hbəs	-	III	III	IV	IV	
P = Preventive (reduce event occurrence likelihood)	н	C ³ 25.0 rem		C ³ 100 rem	C ³ 100 rem	Sons	<u> </u>					
M = Mitigative (reduces event consequences)	М	25.0 rem > C ³ 5 rem	1	100 rem > C ³ 25 rem	100 rem > C 3 25 rem	ال	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 13.4 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:	See Section I Chapter 04	L:
	during manual handling of un-	C:		C:
	encased lead bricks, lead shot, lead	R:		R:
	sheets, lead paint, and soldering			
	operations.			
Beryllium	Hazard: Potential exposure to	L:	See Section I Chapter 04	L:
	beryllium dust during manual	C:		C:
	handling of un-encased activities	R:		R:
	(including clean-up).			

Chemical Hazard Consequences, derived from Figure C-	1, "E	kample Qualitative Cons	equenc	ce Matrix", DOE-HDBK-	1163-2020.						
Likelihood (L, of event)/year	Co	nsequence (C, of event)	/year	Risk (R, Qualitative Ranking)			Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (eve	nt) of major concern				Likel	ihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern	l	ı	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	- 1	Ш	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	iences	М	II	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	Sedu	ı	Ш	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	н	C ³ PAC-2		C ³ PAC-3	C 3 IDLH	Cons					
M = Mitigative (reduces event consequences)	М	PAC-2 > C ³ PAC-1	F	PAC-3 > C ³ PAC-2	IDLH > C 3 PEL or TLVc	└	N	IV	IV	IV	IV
Acronyms	L	PAC-1 > C		PAC-2 > C	PEL or TLV _c > C						
IDLH = Immediately Dangerous to Life and Health MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit TLV _c = 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 13.5 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:	See Section I Chapter 04	L:
	during manual handling of un-	C:		C:
	encased lead bricks, lead shot, lead	R:		R:
	sheets, lead paint, and soldering			
	operations.			
Beryllium	Hazard: Potential exposure to	L:	See Section I Chapter 04	L:
	beryllium dust for personnel in the	C:		C:
	vicinity of manual handling of un-	R:		R:
	encased material.			

Chemical Hazard Consequences, derived from Figure C-	1, "E	xample Qualitative Cons	equenc	ce Matrix", DOE-HDBK-	1163-2020.						
Likelihood (L, of event)/year	Co	nsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (eve	nt) of major concern				Likel	ihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		ı	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	- 1	Ш	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	iences	М	II	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	edu	ı	Ш	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ PAC-2		C ³ PAC-3	C 3 IDLH	Cons	_				
M = Mitigative (reduces event consequences)	М	PAC-2 > C ³ PAC-1	F	PAC-3 > C ³ PAC-2	IDLH > C 3 PEL or TLVc	1 L	N	IV	IV	IV	IV
Acronyms	L	PAC-1 > C		PAC-2 > C	PEL or TLV _c > C						
IDLH = Immediately Dangerous to Life and Health MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit TLV _c = 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 13.6 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:	See Section I Chapter 04	L:
		C:		C:
		R:		R:
Beryllium	Hazard: Potential exposure to	L:	See Section I Chapter 04	L:
	beryllium.	C:		C:
		R:		R:

Chemical Hazard Consequences, derived from Figure C-	1, "E	kample Qualitative Cons	equenc	e Matrix", DOE-HDBK-	1163-2020.						
Likelihood (L, of event)/year	Co	nsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (eve	nt) of major concern				Like	lihood	1
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		ı	Α	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	II	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	lenc	М	П	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	edr	ı	III	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ PAC-2		C ³ PAC-3	C 3 IDLH	Ü					
M = Mitigative (reduces event consequences)	М	PAC-2 > C ³ PAC-1	P	PAC-3 > C ³ PAC-2	IDLH > C 3 PEL or TLVc		N	IV	IV	IV	IV
Acronyms	L	PAC-1 > C		PAC-2 > C	PEL or TLV _c > C						
IDLH = Immediately Dangerous to Life and Health MOI = Maximally-exposed Offsite Individual PAC = Protective Action Criteria PEL = Permissible Exposure Limit TLV _c = 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 13.7 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, wood cribbing, etc.)	This hazard is a potential facility fire. The presence of excessive combustible materials can pose a hazard stemming from inadequate housekeeping practices. This hazard can add to the fuel load of a potential facility fire. Poor housekeeping can also lead to life safety concerns, such as egress obstructions and tripping hazards. The exposure of the hazard to the facility worker is of major concern.	L: C: R:	See Section I Chapter 04.	L: C: R:

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, Qualitat	tive Ra	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation	ı (ever	nt) of major concern				Like	lihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situatio	n (eve	ent) of concern	_		Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situatio	on (eve	ent) of minor concern	se s	Н	- 1	- I	Ш	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situatio	on (eve	ent) of minimal concern	saouanba	М	Ш	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located work	er)	Onsite-1 (facility worker)	edn	ı	III	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Prompt worker fata	ality	C ³ Prompt worker fatality	Cons					
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that i		or acute injury that is	L	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 disablin	ıg.	permanently disabling.						
		take protective									
		action.									
	М	C ³ Mild, transient	C ³ Serious injury, no	0	C 3 Serious injury, no						
		adverse effects.	immediate loss of life	no	immediate loss of life no						
			permanent disabilitie	es;	permanent disabilities;						
			hospitalization require	ed.	hospitalization required.						
	L	Mild, transient	Minor injuries; no		Minor injuries; no						
		adverse effects > C	hospitalization > C		hospitalization > C						
	N	Consequences less	Consequences less th	an	Consequences less than						
		than those for Low	those for Low Conseque	ence	those for Low						
		Consequence Level	Level		Consequence Level						

Table 13.8 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	Hazard:	L:	See Section I Chapter 04.	L: C:
materials (cables, Boxes, Paper, wood cribbing, etc.)	The presence of excessive combustible materials can pose a hazard stemming from inadequate housekeeping practices. This hazard can add to the fuel load of a potential fire. Poor housekeeping can also lead to life safety concerns, such as egress obstructions and tripping hazards. The exposure of the hazard to the co-located worker is of concern.	C: R:		C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exar	nple Qualitative Consequ	ence Matrix", DOE-HDBK-116	53-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event),	/year Risk (R, Qualitative R	anking)	Risk	Matrix	(
A = Anticipated (L > 1.0E-02)		H = High	I = situation (eve	nt) of major concern				Like	lihood	1
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern		1	Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	nces	Н	- 1	- 1	П	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	lenc	М	П	H	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	Ш	III	IV	IV
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) 	Н	C ³ Irreversible, other serious effects, or	C ³ Prompt worker fatality or acute injury that is	C ³ Prompt worker fatality or acute injury that is	Cons	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 ³ Mild, transient	C 3 Serious injury, no	C ³ 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 13.9 Flammable and Combustible Materials – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
materials (cables, Boxes, Paper, wood cribbing, etc.) The state of th	Hazard: The presence of excessive combustible materials can pose a hazard stemming from inadequate housekeeping practices. This hazard can add to the fuel load of a potential fire. Poor housekeeping can also lead to life safety concerns, such as egress obstructions and tripping hazards. The exposure of the hazard to the public is of minimal concern.	L: C: R:	See Section I Chapter 04.	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exar	nple Qualitative Consequ	ience Matrix", DOE-HDBK-116	53-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event),	/year Risk (R, Qualitative R	anking)	Risk	Matrix	(
A = Anticipated (L > 1.0E-02)		H = High	I = situation (eve	nt) of major concern				Like	lihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern		1	Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	nces	Н	- 1	- 1	П	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	lenc	М	П	H	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	nbəs	1	Ш	III	IV	IV
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) 	Н	C ³ Irreversible, other serious effects, or	C ³ Prompt worker fatality or acute injury that is	C ³ Prompt worker fatality or acute injury that is	Cons	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 ³ Mild, transient	C 3 Serious injury, no	C ³ 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 13.10 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:	L:	See Section I, Chapter 04.	L:
Exposure	 Shock hazard voltage > 50V, Non-interlocked enclosures 	C: R:		C: R:
	 Arc Flash, Non- interlocked enclosures 	L: C: R:		L: C: R:
High Voltage	Hazard:	L:	See Section I, Chapter 04.	L:
Exposure	 Shock hazard voltage > 50V, Interlocked enclosures 	C: R:		C: R:
	Arc Flash, Interlocked	L:		L:
	enclosures	C: R:		C: R:
Low Voltage,	Hazard:	L:	See Section I, Chapter 04.	L:
High Current	 Arc Flash, Non- 	C:		C:
Exposure	interlocked enclosures	R:		R:
	 Fire hazard from high 	L:		L:
	current causing smoke	C:		C:
	inhalation and burns.	R:		R:

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Low Voltage,	Hazard:	L:	See Section I, Chapter 04.	L:
High Current	Arc Flash, Interlocked	C:		C:
Exposure	enclosures	R:		R:
	Fire hazard from high current	1.		1.
	causing smoke inhalation and	L:		L.
	burns.	C:		C:
	Duitis.	R:		R:

Likelihood (L, of event)/year	Co	nsequence (C, of event)/	year	Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				Likel	ihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		<pre>II = situation (eve</pre>	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	- 1	Ш	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	ences	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	sedn	L	III	III	IV	IV
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual 	Н	C ³ Irreversible, other serious effects, or symptoms which could impair an individual's ability to take protective action.	or a	ompt worker fatality acute injury that is mmediately life- threatening or manently disabling.	C ³ Prompt worker fatality or acute injury that is immediately life- threatening or permanently disabling.	Con	N	IV	IV	IV	IV
	M	C ³ Mild, transient adverse effects. Mild, transient adverse effects > C	immo perr hosp N	Serious injury, no ediate loss of life no manent disabilities; italization required. Ainor injuries; no ospitalization > C	C ³ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no 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 13.11 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:		See Section I, Chapter 04.	
Exposure	 Shock hazard, voltage > 50 V, Non-interlocked enclosures Arc Flash, Non- interlocked enclosures 	L: C: R: L: C: R:		L: C: R: L: C: R:
High Voltage	Hazard:		See Section I, Chapter 04.	
Exposure	 Shock hazard, voltage > 50V, Interlocked enclosures 	L: C: R:		L: C: R:
	Arc Flash, Interlocked enclosures	L: C: R:		L: C: R:

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Low Voltage, High	Hazard:		See Section 1, Chapter 04.	
Current Exposure	 Arc Flash, Non-interlocked 	L:		L:
	enclosures	C:		C:
		R:		R:
	 Fire hazard from high 			
	current causing smoke	L:		L:
	inhalation and burns.	C:		C:
		R:		R:
Low Voltage, High	Hazard:		See Section 1, Chapter 04.	
Current Exposure	 Arc Flash, Interlocked 	L:		L:
	enclosures	C:		C:
		R:		R:
	 Fire hazard from high 			
	current causing smoke	L:		L:
	inhalation and burns.	C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	ence N	/latrix", DOE-HDBK-116	3-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year	Risk (R, Qualitative R	anking)	Risk	Matrix	(
A = Anticipated (L > 1.0E-02)		H = High		I = situation (eve	nt) of major concern				Like	ihood	
U = 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	- 1	Ш	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	lenc	М	П	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	e-2 (co-located worker)	Onsite-1 (facility worker)) jedn	1	Ш	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pi	rompt worker fatality	C ³ Prompt worker fatality	Cons					
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	per	manently disabling.	permanently disabling.						

	take protective		
	action.		
М	C ³ Mild, transient	C ³ Serious injury, no	C 3 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 13.12 Electrical Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
High Voltage	Hazard: Shock Hazard, >50V, Arc	L:	See Section I, Chapter 04.	L:
Exposure	Flash	C:		C:
		R:		R:
Low Voltage,	Hazard: N/A	L:		L:
High Current		C:		C:
Exposure		R:		R:

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 Ra	anking)	Risk Matrix						
A = Anticipated (L > 1.0E-02)		H = High	I = situation (ever	I = situation (event) of major concern				Likelihood			
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	ent) of concern		1	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	- 1	- 1	H	Ш	
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	tion (event) of minimal concern		М	II	Ш	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sednences	ı	Ш	III	IV	IV	
P = Preventive (reduce event occurrence likelihood)M = Mitigative (reduces event consequences)	Н	C ³ Irreversible, other serious effects, or	C ³ Prompt worker fatality or acute injury that is	C ³ Prompt worker fatality or acute injury that is	Cons	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.									
		C ³ Mild, transient	C ³ Serious injury, no	C 3 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							
		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 13.13 Thermal Energy – Onsite-1 Facility Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
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Hot Work	Hazard:	L:	See Section I Chapter 4.	L:
		C:		C:
	Hot work will cause elevated	R:		R:
	temperatures. If hot work is not			
	supervised, there is a potential			
	for combustibles in the			
	surrounding area to be ignited			
	due to exposure to slag or			
	elevated temperatures. This could			
	lead to excessive heat and			
	burning, which could potentially			
	lead to a fire.			
	The presence of excessive			
	combustible materials can pose a			
	hazard stemming from			
	inadequate housekeeping			
	practices.			
	This hazard can add to the fuel			
	load of a potential fire.			
	The exposure of the hazard to the			
	facility worker is of major			
	concern.			
Cryogenics	Hazard:	L:	See Section I Chapter 4.	L:
		C:		C:
		R:		R:

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
	Cryogenics are inherently a low risk on their own as they are non-flammable and non-toxic.			
	However, if exposed to the cryogenic liquids, they have the potential of burning skin and creating an oxygen deficient atmosphere which can lead to death.			
	The exposure of the hazard to the facility worker is of major concern.			

Other Hazard Consequences, derived from Figure C-1, "					Diele	Matrix				
Likelihood (L, of event)/year		onsequence (C, of event)	•			iviatrix				
A = Anticipated (L > 1.0E-02)		H = High	· ·	I = situation (event) of major concern				Likelihood A U EU		
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve	•		·	Α .	U		BEU
EU = Extremely Unlikely $(1.0E-04 > L > 1.0E-06)$		L = Low	III = situation (eve	ent) of minor concern	ences	Н	'	'	II	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	len	М	II	H	III	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	Consequ	1	Ш	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Prompt worker fatality	C ³ Prompt worker fatality	l suo					
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	ا ا	N	IV	IV	IV	IV
Acronyms		symptoms which	immediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	threatening or	threatening or threatening or						
		individual's ability to	permanently disabling.	permanently disabling.						
		take protective								
		action.								
	М	C ³ Mild, transient	C ³ Serious injury, no	C ³ Serious injury, no						
		adverse effects.	immediate loss of life no	immediate loss of life no						
			permanent disabilities;	permanent disabilities;						
			hospitalization required.	hospitalization required.						
		Mild, transient	Minor injuries; no	Minor injuries; no						
		adverse effects > C	hospitalization > C	hospitalization > C						
		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 13.14 Thermal Energy – Onsite-2 Co-located Worker

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
--------	--------------------	----------------------------------------------------------	-------------------------------------	----------------------------------------------------

Hot Work	Hazard:	L:	See Section I Chapter 04.	L:
		C:		C:
	Hot work will cause elevated	R:		R:
	temperatures. If hot work is not			
	supervised, there is a potential			
	for combustibles in the			
	surrounding area to be ignited			
	due to exposure to slag or			
	elevated temperatures. This could			
	lead to excessive heat and			
	burning, which could potentially			
	lead to a fire.			
	The presence of excessive			
	combustible materials can pose a			
	hazard stemming from			
	inadequate housekeeping			
	practices.			
	This hazard can add to the fuel			
	load of a potential fire.			
	The exposure of the hazard to the			
	co-located worker is of minor			
	concern.			
Cryogenics	Hazard:	L:	See Section I Chapter 04.	L:
, 5		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	ience Ma	trix", DOE-HDBK-116	3-2020.							
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	/year F	Risk (R, Qualitative Ra	anking)	Risk	Matrix					
A = Anticipated (L > 1.0E-02)		H = High		I = situation (event) of major concern					Likelihood			
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		1	Α	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	ses	Н	- 1	- 1	Ш	Ш	
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	ences	М	Ш	H	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsite-2	(co-located worker)	Onsite-1 (facility worker)	nbə	ı	111	III	IV	IV	
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pro	mpt worker fatality	C ³ Prompt worker fatality	Cons						
M = Mitigative (reduces event consequences)		serious effects, or	or ac	cute injury that is	or acute injury that is		N	IV	IV	IV	IV	
Acronyms		symptoms which	im	mediately life-	immediately life-							
MOI = Maximally-exposed Offsite Individual		could impair an	tł	hreatening or	threatening or							
		individual's ability to	perma	anently disabling.	permanently disabling.							
		take protective										
		action.										
	М	C ³ Mild, transient	C ³ S	Serious injury, no	C ³ Serious injury, no							
		adverse effects.	immed	diate loss of life no	immediate loss of life no							
			perma	anent disabilities;	permanent disabilities;							
			hospit	alization required.	hospitalization required.							
	L	Mild, transient	Mii	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 2.15 Thermal Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Hot Work	Hazard:	L: C:	See Section I Chapter 04.	L: C:
		R:		R:
Cryogenic Liquids	Hazard:	L: C: R:	See Section I Chapter 04.	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exar	nple Qualitative Consequ	uence Ma	atrix", DOE-HDBK-116	53-2020.								
Likelihood (L, of event)/year	Co	onsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk	Matrix						
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				Like	lihood	•		
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		<pre>II = situation (eve</pre>	ent) of concern	l —	1	Α	U	EU	BEU		
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	Ses	Н	- 1	- 1	H	Ш		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		<pre>IV = situation (ev</pre>	ent) of minimal concern	l	M	П	- II	Ш	IV		
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	sedneuces	- 1	Ш	III	IV	IV		
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pro	mpt worker fatality	C ³ Prompt worker fatality	Cons	_						
M = Mitigative (reduces event consequences)		serious effects, or		cute injury that is	or acute injury that is		N	IV	IV	IV	IV		
Acronyms		symptoms which		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.											
	M	C 3 Mild, transient	C 3 S	Serious injury, no	C 3 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								
	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 13.16 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	Hazard: Personnel injury due to	L:	See Section I Chapter 04.	L:
1 OWEI 10013	improper use of power tools.	C:		C:
		R:		R:
Pumps and	Hazard: Personal injury due to	L:	See Section I Chapter 04.	L:
Motors	entrapment/entanglement.	C:		C:
		R:		R:
Motion Tables	Hazard: Personnel injury due to pinch	L:	See Section I Chapter 04.	L:
	points, tip-overs, caught in between.	C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	onsequence (C, of event),	year Risk (R, Qualitative Ra	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (event) of major concern			Likelihood			
U = 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	ces	Н	- 1	-	П	≡
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (ev	ent) of minimal concern	e	М	П	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sedu		Ш	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Prompt worker fatality	C ³ Prompt worker fatality	Cons					
M = Mitigative (reduces event consequences)		serious effects, or	or acute injury that is	or acute injury that is	L	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 ³ Mild, transient	C ³ Serious injury, no	C ³ 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 13.17 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	Hazard: Personnel injury due to	L:	See Section I Chapter 04.	L:
rower tools	power tool use (flying debris, struck	C:		C:
	by object).	R:		R:
Pumps and	Hazard: Personal injury due to	L:	See Section I Chapter 04.	L:
Motors	entrapment/entanglement.	C:		C:
		R:		R:
Motion Tables	Hazard: Personnel injury due to tip-	L:	See Section I Chapter 04.	L:
	overs, caught in between, crushing.	C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exar	nple Qualitative Consequ	ence N	/latrix", DOE-HDBK-116	53-2020.						
Likelihood (L, of event)/year	Consequence (C, of event)/year Risk (R, Qualitative Ranking) Risk Matrix										
A = Anticipated (L > 1.0E-02)		H = High		I = situation (eve	nt) of major concern				Likelihood		
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		1	Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	ces	Н	ı	1	П	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	lenc	М	П	П	111	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	sedr	L	Ш	III	IV	IV
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual 	Н	C ³ Irreversible, other serious effects, or symptoms which could impair an individual's ability to take protective action.	or i	rompt worker fatality acute injury that is immediately life-threatening or manently disabling.	C ³ Prompt worker fatality or acute injury that is immediately life- threatening or permanently disabling.	Con	N	IV	IV	IV	IV
	M	C ³ 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 nospitalization > C	C ³ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no hospitalization > C						

Table 13.18 Kinetic Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Power tools	Hazard: N/A	L: C: R:	Public is prevented from having access to work areas.	L: C: R:
Pumps and Motors	Hazard: N/A	L: C: R:	Public is prevented from having access to work areas.	L: C: R:
Motion Tables	Hazard: N/A	L: C: R:	Public is prevented from having access to work areas.	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exar	nple Qualitative Consequ	ence N	/latrix", DOE-HDBK-116	53-2020.						
Likelihood (L, of event)/year	Consequence (C, of event)/year Risk (R, Qualitative Ranking) Risk Matrix										
A = Anticipated (L > 1.0E-02)		H = High		I = situation (eve	nt) of major concern				Likelihood		
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		1	Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low		III = situation (ev	ent) of minor concern	ces	Н	ı	1	П	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	lenc	М	П	П	111	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	sedr	L	Ш	III	IV	IV
 P = Preventive (reduce event occurrence likelihood) M = Mitigative (reduces event consequences) Acronyms MOI = Maximally-exposed Offsite Individual 	Н	C ³ Irreversible, other serious effects, or symptoms which could impair an individual's ability to take protective action.	or i	rompt worker fatality acute injury that is immediately life-threatening or manently disabling.	C ³ Prompt worker fatality or acute injury that is immediately life- threatening or permanently disabling.	Con	N	IV	IV	IV	IV
	M	C ³ 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 nospitalization > C	C ³ Serious injury, no immediate loss of life no permanent disabilities; hospitalization required. Minor injuries; no hospitalization > C						

Table 13.19 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	Hazard: personnel injury due to	L:	See Section I Chapter 04.	L:
	improper crane operations.	C:		C:
		R:		R:
Compressed	Hazard: Personnel injury due to	L:	See Section I Chapter 04.	L:
Gasses	unexpected release, or unsecure	C:		C:
	tanks.	R:		R:
Vacuum Pumps	Hazard: Personnel injury due to	L:	See Section I Chapter 04.	L:
	entrapment/entanglement.	C:		C:
		R:		R:
Material	Hazard: Personnel injury due to	L:	See Section I Chapter 04.	L:
Handling	improper operation of Powered	C:		C:
	Industrial Trucks and their attachments (rollovers, crush, etc.).	R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Consequ	uence Ma	atrix", DOE-HDBK-116	53-2020.								
Likelihood (L, of event)/year	Co	onsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk	Matrix	1					
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				Likelihood				
U = 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	nces	Н	- 1	- 1	П	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		<pre>IV = situation (ev</pre>	ent) of minimal concern	nenc	М	П	Ш	Ш	IV		
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	Sedu	ı	III	Ш	IV	IV		
P = Preventive (reduce event occurrence likelihood)	н	C ³ Irreversible, other	C ³ Pro	ompt worker fatality	C ³ Prompt worker fatality	Cons	_						
M = Mitigative (reduces event consequences)		serious effects, or		icute injury that is	or acute injury that is		N	IV	IV	IV	IV		
Acronyms		symptoms which		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 ³ Mild, transient	C 3	Serious injury, no	C ³ 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	М	linor injuries; no	Minor injuries; no								
		adverse effects > C	ho	spitalization > C	hospitalization > C								
	N	Consequences less	Cons	equences less than	Consequences less than								
		than those for Low	those f	or Low Consequence	those for Low								
		Consequence Level		Level	Consequence Level								

Table 13.20 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	Hazard: Struck by falling, swinging	L:	See Section I Chapter 04.	L:
	loads.	C:		C:
		R:		R:
Compressed	Hazard: Collocated personnel injury	L:	See Section I Chapter 04.	L:
Gasses	due to unexpected release, or	C:		C:
	unsecure tanks.	R:		R:
Vacuum Pumps	Hazard: Personnel injury due to	L:	See Section I Chapter 04.	L:
	interaction with existing vacuum.	C:		C:
		R:		R:
Material Handling	Hazard: Collocated personnel	L:	See Section I Chapter 04.	L:
	injury due to moving/handing	C:		C:
	material (rollovers, crush, etc.)	R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	ence Ma	atrix", DOE-HDBK-116	53-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year	Risk (R, Qualitative Ra	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				lihood		
U = 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	- 1	П	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	ences	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	edno	ı	111	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pro	mpt worker fatality	C ³ Prompt worker fatality	Su					
M = Mitigative (reduces event consequences)		serious effects, or	or a	cute injury that is	or acute injury that is		N	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 ³ Mild, transient	C ³ S	Serious injury, no	C ³ 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						
	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 13.21 Potential Energy – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Crane	Hazard: N/A	L:		L:
Operations		C:		C:
		R:		R:
Compressed	Hazard: Injury due to unexpected	L:	See Section I Chapter 04.	L:
Gasses	release, or unsecure tanks outside	C:		C:
	of buildings.	R:		R:
Vacuum Pumps	Hazard: N/A	L:		L:
		C:		C:
		R:		R:
Material	Hazard: N/A	L:		L:
Handling		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	ience Ma	atrix", DOE-HDBK-116	3-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	/year	Risk (R, Qualitative Ra	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				lihood		
U = 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	ses	Н	- 1	- 1	П	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	ences	М	Ш	H	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	nbə	ı	111	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pro	mpt worker fatality	C ³ Prompt worker fatality	Cons					
M = Mitigative (reduces event consequences)		serious effects, or	or a	cute injury that is	or acute injury that is		N	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 ³ Mild, transient	C ³ S	Serious injury, no	C 3 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						
	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 13.22 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	 Exposure to fringe fields beyond allowable limits (worker with ferromagnetic or electronic medical device(s)) Exposure to fringe fields beyond allowable limits (worker without ferromagnetic or electronic medical device(s)) Exposure to flying metallic objects causing potential injury. 	L: C: R:	No energized magnets or ion pumps As per IH assessment, no SMF hazard N/A	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exar	nple Qualitative Consequ	ience Matrix", DOE-HDBK-11	63-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)	/year Risk (R, Qualitative F	Ranking)	Risk	Matrix	(
A = Anticipated (L > 1.0E-02)		H = High	I = situation (eve	ent) of major concern				lihood	ı	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (ev	ent) of concern			Α	U	EU	BEU
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		$\mathbf{L} = Low$	III = situation (ev	vent) of minor concern	nces	Н	- 1	- 1	П	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (e	vent) of minimal concern	lenc	М	II	H	III	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sedn	-	Ш	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Prompt worker fatality	C ³ Prompt worker fatality	Cons	_				
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 ³ Mild, transient	C ³ Serious injury, no	C ³ 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 13.23 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	 Exposure to fringe fields beyond allowable limits (worker with ferromagnetic or electronic medical device(s)) Exposure to fringe fields beyond allowable limits (worker without ferromagnetic or electronic medical device(s)) Exposure to flying metallic objects causing potential injury. 	L: C: R:	No energized magnets or ion pumps As per IH assessment, no SMF hazard N/A	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Consequ	uence Ma	atrix", DOE-HDBK-116	53-2020.								
Likelihood (L, of event)/year	Co	onsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk	Matrix	1					
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				Likelihood				
U = 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	nces	Н	- 1	- 1	П	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		<pre>IV = situation (ev</pre>	ent) of minimal concern	nenc	М	П	Ш	Ш	IV		
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	Sedu	ı	III	Ш	IV	IV		
P = Preventive (reduce event occurrence likelihood)	н	C ³ Irreversible, other	C ³ Pro	ompt worker fatality	C ³ Prompt worker fatality	Cons	_						
M = Mitigative (reduces event consequences)		serious effects, or		icute injury that is	or acute injury that is		N	IV	IV	IV	IV		
Acronyms		symptoms which		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 ³ Mild, transient	C 3	Serious injury, no	C ³ 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	М	linor injuries; no	Minor injuries; no								
		adverse effects > C	ho	spitalization > C	hospitalization > C								
	N	Consequences less	Cons	equences less than	Consequences less than								
		than those for Low	those f	or Low Consequence	those for Low								
		Consequence Level		Level	Consequence Level								

Table 13.24 Magnetic Fields – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Fringe Fields	Hazard:	L:	No energized magnets or ion pumps	L:
	 Exposure to fringe fields beyond allowable limits (worker with ferromagnetic or electronic medical device(s)) 	C: R:	As per IH assessment, no SMF hazard N/A	C: R:
	 Exposure to fringe fields beyond allowable limits (worker without ferromagnetic or electronic medical device(s)) Exposure to flying 			
	metallic objects causing potential injury.			

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Consequ	uence Ma	atrix", DOE-HDBK-116	53-2020.								
Likelihood (L, of event)/year	Co	onsequence (C, of event)	/year	Risk (R, Qualitative R	anking)	Risk	Matrix	1					
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				Likelihood				
U = 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	nces	Н	- 1	- 1	П	III		
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		<pre>IV = situation (ev</pre>	ent) of minimal concern	nenc	М	П	Ш	Ш	IV		
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	Sedu	ı	III	Ш	IV	IV		
P = Preventive (reduce event occurrence likelihood)	н	C ³ Irreversible, other	C ³ Pro	ompt worker fatality	C ³ Prompt worker fatality	Cons	_						
M = Mitigative (reduces event consequences)		serious effects, or		icute injury that is	or acute injury that is		N	IV	IV	IV	IV		
Acronyms		symptoms which		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 ³ Mild, transient	C 3	Serious injury, no	C ³ 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	М	linor injuries; no	Minor injuries; no								
		adverse effects > C	ho	spitalization > C	hospitalization > C								
	N	Consequences less	Cons	equences less than	Consequences less than								
		than those for Low	those f	or Low Consequence	those for Low								
		Consequence Level		Level	Consequence Level								

Table 13.25 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	Hazard:	L: A	P: Confined Space training informs workers of hazard and process for	L: BEU
	 Limited egress 	C: H	working in the confined space.	C: M
		R: I	P: Work practice procedure requires use of an attendant, outside of the enclosure. P: "Permit Required Access" and "Reclassification" require ES&H approval on every access. M: Mechanical ventilation active, when required.	R: IV
Noise	Hazard:	L:	See Section I, Chapter 04.	L:
		C:		C:
		R:		R:
Ergonomics	Hazard:	L:	See Section I, Chapter 04.	L:
		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Conseque	ience Ma	atrix", DOE-HDBK-116	3-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	/year	Risk (R, Qualitative Ra	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (ever	nt) of major concern				lihood		
U = 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	ses	Н	- 1	- 1	II	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	ences	М	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2	2 (co-located worker)	Onsite-1 (facility worker)	nbə	ı	111	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pro	mpt worker fatality	C ³ Prompt worker fatality	Cons					
M = Mitigative (reduces event consequences)		serious effects, or	or ac	cute injury that is	or acute injury that is		N	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 ³ Mild, transient	C ³ S	Serious injury, no	C 3 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	Mild, transient Min		Minor injuries; no						
		adverse effects > C	ndverse effects > C hosp		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 13.26 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	Hazard: • Accidental entry	L: BEU C: H R: III	P: Work practice procedure requires use of an attendant, outside of the enclosure to warn of hazard.	L: BEU C: H R: III
Noise	Hazard:	L: C: R:	See Section I, Chapter 04.	L: C: R:
Ergonomics	Hazard:	L: C: R:	See Section I, Chapter 04.	L: C: R:

Other Hazard Consequences, derived from Figure C-1, "	Exan	nple Qualitative Consequ	ence Matrix", DOE-HDBK-11	63-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year Risk (R, Qualitative I	Ranking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High	I = situation (ev	I = situation (event) of major concern				Like	lihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (ev	ent) of concern			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	- 1	- 1	Ш	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	IV = situation (e	vent) of minimal concern	enc	М	Ш	П	III	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sednences	-	III	III	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Prompt worker fatality	C ³ Prompt worker fatality	Cons					
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 ³ Mild, transient	C ³ Serious injury, no	C ³ 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 13.27 Other hazards – MOI Offsite

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Confined Spaces	Hazard: • Accidental entry	L: BEU C: H R: III	P: Work practice procedure requires use of an attendant, outside of the enclosure.	L: BEU C: H R: III
Noise	Hazard:	L: C: R:	See Section I, Chapter 04.	L: C: R:
Ergonomics	Hazard:	L: C: R:	See Section I, Chapter 04.	L: C: 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)		H = High		nt) of major concern				Like	lihood		
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate	II = situation (eve				Α	U	EU	BEU	
EU = Extremely Unlikely (1.0E-04 > L >1.0E-06)		L = Low	III = situation (ev	ent) of minor concern	l sa	Н	- 1	- 1	II	III	
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible	•	rent) of minimal concern	enc	М	П	Ш	Ш	IV	
Control(s) Type	С	Offsite (MOI)	Onsite-2 (co-located worker)	Onsite-1 (facility worker)	sednences			III	IV	IV	
P = Preventive (reduce event occurrence likelihood)	н	C ³ Irreversible, other	C ³ Prompt worker fatality	C ³ Prompt worker fatality	Cons	L	III	""	IV	IV	
M = Mitigative (reduces event consequences)	I .	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 ³ Mild, transient	C ³ Serious injury, no	C ³ 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 13.28 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	Hazard:	L:	See Section I, Chapter 04.	L:
Egress		C:		C:
		R:		R:

Likelihood (L, of event)/year	Co	nsequence (C, of event)/	year	Risk (R, Qualitative R	anking)	Risk	Matrix		-	-	
A = Anticipated (L > 1.0E-02)		H = High		I = situation (event) of major concern					Like	lihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern	ļ _r		Α	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	Ш	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	e	М	П	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	nbəsı	1	III	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)M = Mitigative (reduces event consequences)	Н	C ³ Irreversible, other serious effects, or		ompt worker fatality acute injury that is	C ³ Prompt worker fatality or acute injury that is	Cons	N	IV	IV	IV	IV
Acronyms		symptoms which		mmediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an		threatening or	threatening or						
		individual's ability to	peri	manently disabling.	permanently disabling.						
		take protective	•	, 0	, ,						
		action.									
	М	C ³ Mild, transient	C ³	Serious injury, no	C ³ Serious injury, no						
		adverse effects.	imm	ediate loss of life no	immediate loss of life no						
			peri	manent disabilities;	permanent disabilities;						
			hospita		hospitalization required.						
	L	Mild, transient			Minor injuries; no						
		adverse effects > C hos		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 13.29 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	Hazard:	L:	See Section I, Chapter 04.	L:
Egress		C:		C:
		R:		R:

Other Hazard Consequences, derived from Figure C-1,	'Exan	nple Qualitative Conseque	ence Mat	trix", DOE-HDBK-116	3-2020.						
Likelihood (L, of event)/year	Co	onsequence (C, of event)/	year R	Risk (R, Qualitative R	anking)	Risk	Matrix				
A = Anticipated (L > 1.0E-02)		H = High		I = situation (event) of major concern						ihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		<pre>II = situation (eve</pre>	ent) of concern		1	Α	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	III
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		<pre>IV = situation (ev</pre>	ent) of minimal concern	l la	M	Ш	П	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite-2	(co-located worker)	Onsite-1 (facility worker)	nbəs	1	III	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)	Н	C ³ Irreversible, other	C ³ Pron	mpt worker fatality	C ³ Prompt worker fatality	Cons					
M = Mitigative (reduces event consequences)		serious effects, or	or act	cute injury that is	or acute injury that is	L	N	IV	IV	IV	IV
Acronyms		symptoms which	imr	mediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an	th	nreatening or	threatening or						
		individual's ability to	perma	anently disabling.	permanently disabling.						
		take protective									
		action.									
	М	C ³ Mild, transient	C ³ Se	erious injury, no	C ³ Serious injury, no						
		adverse effects.	immed	diate loss of life no	immediate loss of life no						
			perma	anent disabilities;	permanent disabilities;						
			hospita		hospitalization required.						
	L	Mild, transient Mi		nor injuries; no	Minor injuries; no						
		adverse effects > C ho		spitalization > C	hospitalization > C						
	N	Consequences less	Conse	quences less than	Consequences less than						
		than those for Low	those for	r Low Consequence	those for Low						
		Consequence Level		Level	Consequence Level						

Table 13.30 Access & Egress – MOI Offsite

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

Likelihood (L, of event)/year	Co	nsequence (C, of event)/	year	Risk (R, Qualitative R	anking)	Risk	Matrix		-		
A = Anticipated (L > 1.0E-02)		H = High		I = situation (event) of major concern					Like	ihood	
U = Unlikely (1.0E-02> L >1.0E-04)		M = Moderate		II = situation (eve	ent) of concern		1	Α	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	Ш
BEU = Beyond Extremely Unlikely (1.0E-06> L)		N = Negligible		IV = situation (ev	ent) of minimal concern	e	М	П	Ш	Ш	IV
Control(s) Type	С	Offsite (MOI)	Onsite	-2 (co-located worker)	Onsite-1 (facility worker)	nbəsı	1	III	Ш	IV	IV
P = Preventive (reduce event occurrence likelihood)M = Mitigative (reduces event consequences)	Н	C ³ Irreversible, other serious effects, or		ompt worker fatality acute injury that is	C ³ Prompt worker fatality or acute injury that is	Cons	N	IV	IV	IV	IV
Acronyms		symptoms which		mmediately life-	immediately life-						
MOI = Maximally-exposed Offsite Individual		could impair an		threatening or	threatening or						
		individual's ability to	peri	manently disabling.	permanently disabling.						
		take protective	•	, 0	, ,						
		action.									
	М	C ³ Mild, transient	C ³	Serious injury, no	C ³ Serious injury, no						
		adverse effects.	imm	ediate loss of life no	immediate loss of life no						
			peri	manent disabilities;	permanent disabilities;						
			hospita		hospitalization required.						
	L	Mild, transient	'		Minor injuries; no						
		adverse effects > C hos		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 13.31 Environmental

Hazard	Hazard Description	Baseline Qualitative Risk (without controls)	Preventative (P)/ Mitigative (M)	Residual Qualitative Risk (with controls)
Airborne	 Airborne release of radionuclides beyond permitted limits. Discharge of chemicals into onsite surface waters beyond permitted limits. 	L: C: R:	See Section I, Chapter 04.	L: C: R:
Water	 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 04.	L: C: R :

	Risk (without controls)	Preventative (P)/ Mitigative (M)	Qualitative Risk (with controls)
Soil • Radioactive soil in beam loss areas beyond allowable concentrations of radionuclides beyond calculated Fermilab limits. • Discharge of chemicals into onsite soils beyond permitted limits.	:	See Section I, Chapter 04.	L: C: R: