

## GBR HAZARD ASSESSMENT AND PPE SELECTION MATRIX

*Minimum PPE required is based on the potential hazard being present.*

*This list is not all inclusive and in cases where the task is not covered or the SWP or Procedure indicates a higher level of PPE, the SWP or Procedure shall be followed.*

Area/Task	Potential Hazards	Personal Protective Equipment / Monitoring Equipment
1	Reporting to and from assigned work areas	Slips, trips, falls, debris in eye. Long pants Sleeved upper garments Fully covered footwear ANSI approved safety glasses with side shields
2	General entrance into the refinery Production Boundaries	Falling Objects Hard hat Safety-toed footwear with 1/4" defined heel (with a defined angle greater than 60°)
	Flying Debris	ANSI approved safety glasses with side shields
	Flash Fire	Flame Resistant Clothing (Nomex or FR Cotton)
	Hydrogen Sulfide	Personal H <sub>2</sub> S Monitor
3	Entrance Inside Unit's Battery Limits:**Exception: Alky	Falling Objects Hard hat Safety-toed footwear with 1/4" defined heel (with a defined angle greater than 60°)
	Flying Debris	ANSI approved safety glasses with side shields
	Flash Fire	Flame Resistant Clothing (Nomex or FR Cotton)
	Hydrogen Sulfide	Personal H <sub>2</sub> S Monitor
	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3) shall be on your person and worn during work activity.
Noise	Hearing protection (ear plugs and/or muffs)	
4	Medical/Rescue Team Response	Flying debris and/or Bodily fluids Face shield (as needed) Chemical Splash Goggles (as needed)
	Biological hazards	Disposable latex gloves Disposable aprons Barrier breathing device
	Hazardous Atmosphere	Air purifying respirator or SCBA based on the hazard
	Chemical Exposure	Chemical gloves based on the hazard or SDS for the chemical(s) Chemical protective clothing based on the hazard or SDS for the chemical(s) For HF Acid – Use Alky PPE Level A, B, C, D Matrix <b>RSP-1129-010</b> (See Alky PPE)
5	Chemical Spill Response	Flying debris and/or splashed chemicals Face shield + Chemical Splash Goggles (as needed)
	Detection of VOCs	Colormetric pump (Draeger or similar) and detector tubes and/or PID Instrument (UltraRae or similar)
	Hazardous Atmosphere	Air-purifying respirators or SCBA, based on the hazard
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s) Chemical protective clothing based on the SDS for the chemical(s) For HF Acid – Use Alky PPE Level A, B, C, D (See Alky PPE Matrix <b>RSP-1129-010</b> )
6	Firefighting	Hazardous Atmosphere SCBA until gas monitoring dictates no hazardous atmosphere
	Free-burning Fires	Turnout (Bunker) gear Firefighting gloves Steel-Toed/Steel Shank Safety Footwear Balaclava Head Wear
	Falling Objects	Firefighting helmets Steel-toed/steel shank safety footwear

*In addition to the above minimum required PPE, the following Task-Specific PPE may be required depending on the area of operation or task being performed. This list is not all inclusive and in cases where the SWP or Procedure indicates a higher level of PPE, the SWP or Procedure shall be followed.*

Area/Task	Potential Hazards	Personal Protective Equipment / Monitoring Equipment
7	Acid Truck loading	Chemical Exposure Chemical gloves based on the SDS for the chemical(s) Chemical protective clothing based on the SDS for the chemical(s) Rubber boots Face Shield
	Hazardous Atmosphere	SCBA or Supplied Air
8	Alky Units	HF Acid Exposure Follow Alky 3 PPE Matrix ( <b>RSP-1129-010</b> or Alky 3 Procedure <b>ROG-0020-6006</b> )
9	Confined Space Entry	Detection of: Deficient or Oxygen-rich environment Flammable atmosphere Hydrogen Sulfide Carbon Monoxide Benzene VOCs Other Multi-gas monitor (minimum of O <sub>2</sub> LEL, H <sub>2</sub> S and CO) UltraRae 3000 (benzene), or Colorimetric pump (Draeger) when required for a specific chemical (i.e. Ammonia) Respiratory Protection based on gas detection readings
	Hazardous Atmosphere	Air-purifying respirator, SCBA or supplied air respirator with 5 minute escape bottle (based on the hazard and job scope)

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Area/Task	Potential Hazards	Personal Protective Equipment / Monitoring Equipment	
	Falls / Confined Space Rescue	Safety harness Retrieval line <i>**Harness and/or retrieval line requirement may be waived by the Safety Department if use would increase risk</i>	
	Chemical Splashes	Face shield (as needed) Chemical gloves based on the SDS for the chemical(s) Chemical protective clothing based on the SDS for the chemical(s)	
10	Electrical Work	Electrical Shock and/or Arc Flash See NFPA 70E or Electrical Safe Work Practices <b>RSP-1162-000</b>	
11	Entering Analyzer Shelter Building	Detection of Hazardous Vapors Follow <b>GBR-HESS-PR-17</b> General Safety Rules for Analyzer Building Entry Multi-gas monitor (minimum of O <sub>2</sub> , LEL, H <sub>2</sub> S and CO) UltraRae 3000 (benzene) when required	
12	Housekeeping	Sharp edges and other surfaces that will expose hands to cuts/abrasion Flying debris	General duty work gloves (cut-resistant level 3) Safety Glasses
13	Opening/closing valves, using hand or powered tools, climbing, etc.	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
14	Working at Heights (Scaffolds, Manlifts, Leading Edgy, Etc.)	Falls from elevation	Safety harness + Self-retracting lanyard, as required by the <b>GBR-HESS-PR7</b> Fall Protection Policy and <b>GBR-HESS-EQ-4</b> Scaffold Policy
15	Welding, Cutting and Brazing	Radiant Light/Radiant Energy Burns Hazardous Atmosphere	Helmet with appropriate shade number Goggles with appropriate shade number High gauntlet welding gloves Long-sleeved shirt, leather apron and/or leather cap sleeves/bib Exposure to chromium or manganese fumes may require the use of respiratory protection. Refer to GBR Respiratory Protection Policy <b>GBR-HESS-PPE-5</b>
16	Blinding Inside/Outside Battery Limits	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration Flying debris and/or splashed chemicals Chemical Exposure	General duty work gloves (cut-resistant level 3) Face shield + Chemical Splash Goggles PVC chemical protective jacket/pants Air purifying respirator or SCBA, based on the hazard
17	Blowing down taps	Sharp edges and other surfaces that will expose hands to abrasion, cuts Flying debris and/or splashed chemicals	General duty work gloves (cut-resistant level 3) Face shield + Chemical Splash Goggles
18	Boiler Chemicals	Chemical Exposure Flying debris and/or splashed chemicals	Chemical gloves Face shield + Chemical Splash Goggles
19	Cleaning Process Water Screens / Cleaning Slop/Sludge Oil Screens	Chemical Exposure Flying debris and/or splashed chemicals Hazardous Atmosphere	Chemical gloves based on the SDS for the chemical(s) Chemical Splash Goggles ½ Face Respirator with the appropriate filter cartridge (OV, AG, P100)
20	Cleaning Sultrap baskets / Checking Sultrap Boxes	Hot Objects Hazardous Atmosphere	Heat-resistant gloves SCBA or Supplied Air
21	Loading Sulfur at the Scales	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration Falls from elevation Hazardous Atmosphere	General duty work gloves (cut-resistant level 3) Safety harness + Self-retracting lanyard SCBA Unit/Supplied Air
22	Construction Inside/Outside of Operating Areas	Flash Fire Flying debris Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration Detection of: Deficient or Oxygen-rich environment Flammable atmosphere Hydrogen Sulfide Carbon Monoxide Benzene Other	Flame Resistant Clothing (Nomex or FR Cotton) Face shield or goggles General duty work gloves (cut-resistant level 3) Multi-gas monitor (minimum of O <sub>2</sub> , LEL, H <sub>2</sub> S and CO) UltraRae 3000 (benzene) when required Draeger (chemical specific) when required Respiratory Protection based off gas detection

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Area/Task	Potential Hazards	Personal Protective Equipment / Monitoring Equipment
	Falls from elevation	Safety harness + Self-retracting lanyard, as required by the GBR Fall Protection Policy and Scaffold Policy
23 Line Breaks / Preparing equipment for maintenance – Chemical (i.e. caustic, acid) or Hydrocarbon splash potential	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s) Rubber boots
	Flying debris and/or splashed chemicals	Face shield + Chemical Splash goggles
	Hazardous Atmosphere	Respiratory protection, based on the hazard and gas test results.
24 Live Flare Header Invasive Work - Workers and Backup Personnel (non-HF Alky flare headers) (Effective 5/15/2019)	Hazardous Atmosphere	Workers - Suppler Air hose line work unit Backup Personnel - SCBA
	Flash fire / chemical exposure	Turnout (Bunker) gear and Balaclava Head Wear, Firefighting gloves, or Level B that provides: liquid splash chemical protection, FR layer, chemical flash fire protection for escape only in the event of chemical flash fire Steel-Toed/Steel Shank Safety Footwear
	Falling Objects	Firefighting helmets or Hardhat under Level B suit Steel-toed/steel shank safety footwear
25 Polymer Draw Downs/Cleaning Polymer Screens	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s)
	Flying debris and/or splashed chemicals	Chemical Splash Goggles
26 Process Sampling	Splashed chemicals	Chemical Splash Goggles
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s)
	Hazardous Atmosphere	Respiratory protection, based on the hazard and gas test results.
27 Process Sampling – Caustic/Acids	Splashed chemicals	Face shield + Chemical Splash Goggles
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s) PVC chemical protective jacket/pants
	Hazardous Atmosphere	Respiratory protection, based on the hazard and gas test results.
28 Process Sampling – Hot Catalyst	Splashed chemicals	Face shield + Chemical Splash Goggles
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s)
	Hazardous Atmosphere	½ Face Respirator with the appropriate filter cartridge (OV, AG, P100)
29 Process Sampling – Hot Oil	Splashed chemicals	Face shield + Chemical Splash Goggles
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s)
	Hazardous Atmosphere	Respiratory protection, based on the hazard and gas test results.
30 Process Sampling – Sour Water	Splashed chemicals	Face shield + Chemical Splash Goggles
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s)
	Hazardous Atmosphere	Respiratory protection, based on the hazard and gas test results.
31 Rodding out lines/bleeders	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
	Flying debris and/or splashed chemicals	Face shield + Chemical Splash Goggles
32 Sour Water RV/Tank Inspections Sour Water RV PM/compliance Draining Sour Water	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
	Hydrogen Sulfide/Nitrogen	SCBA or Supplied Air
33 Steaming unit for outages	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
	Hazardous Atmosphere	Air purifying respirator or SCBA, based on the hazard
	Noise	Double hearing protection if noise level is greater than 105dBA
34 O <sub>2</sub> freeing the unit	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
	atmosphere/oxygen-deficient atmosphere	Multi-gas monitor (minimum of O <sub>2</sub> LEL, H <sub>2</sub> S and CO) SCBA, based on the hazard
	Flying debris and/or splashed chemicals	Chemical Splash Goggles
	Hazardous Atmosphere Oxygen-deficient atmosphere	Respiratory protection, based on the hazard and gas test results.
35 Unplugging Vents/Drains/Taps	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
	Splashed chemicals	Face shield + Chemical Splash Goggles
	Hazardous Atmosphere	Respiratory protection, based on the hazard and gas test results.
36 Tank Strapping	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration	General duty work gloves (cut-resistant level 3)
	Hydrogen Sulfide/Nitrogen	SCBA or Supplied Air

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Area/Task	Potential Hazards	Personal Protective Equipment / Monitoring Equipment
37	Using Sellars Jet	Steam Exposure General duty work gloves (cut-resistant level 3) PVC chemical protective jacket/pants Rubber boots Face shield + Chemical Splash Goggles
38	Working around Catalyst Dust	Flying debris Chemical Splash Goggles or Spoggles
	Hazardous Atmosphere	½ Face Respirator with the appropriate filter cartridge (OV, AG, P100)
	Chemical Exposure	Chemical gloves based on the SDS for the chemical(s)
39	Confined Space Entry while working inside heaters	Flying debris Chemical Splash Goggles or Spoggles
40	Working around Oily Water Separator	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration General duty work gloves (cut-resistant level 3)
		Detection of: Deficient or Oxygen-rich environment Multi-gas monitor (minimum of O <sub>2</sub> LEL, H <sub>2</sub> S and CO)
		Flammable atmosphere UltraRae 3000 (benzene) when required
		Hydrogen Sulfide Carbon Monoxide Benzene Other Respiratory Protection based off gas detection Draeger (chemical specific) when required
41	Working in designated caustic/acid areas and/or loading caustic/acid	Splashed chemicals Face shield + Chemical Splash Goggles
		Chemical Exposure Chemical gloves based on the SDS for the chemical(s) PVC chemical protective jacket/pants Rubber boots
42	Working in designated chemical areas or any chemical splash potential	Sharp edges and other surfaces that will expose hands to abrasion, cuts and/or impacts, and vibration General duty work gloves (cut-resistant level 3)
		Flying debris and/or splashed chemicals Chemical Splash Goggles
43	Working near or over water	Water Safety USCG approved life jacket
44	<ul style="list-style-type: none"> <li>• Working over clear wells</li> <li>• Brazos River Water Filters</li> <li>• Aeration Basin</li> <li>• Aerobic Digester</li> <li>• Storage Tanks; or on a storage tank internal floating roof undergoing a water test</li> </ul>	Sharp Edges and other surfaces that will abrade hands Leather gloves or other approved cut-resistant/ impact hazard gloves.
		Falls from elevation (outside of guard rails, 4' above a lower level) Full body harness, lanyard, and anchor point.
		Water Safety USCG approved life jacket.
45	Manually lighting heater pilots or burners	Fire FRC Nomex Hood
		Gauntlet style leather gloves
		Faceshield

- 1) Employees shall use appropriate eye or face protection when exposed to hazards from flying particles, liquid chemicals, acids or caustics, chemical gases or vapors, or injurious light radiation. Eyewear shall comply with American National Standards Institute (ANSI) / International Safety Equipment Association (ISEA) Z'87.1 as indicated by labels on the PPE.
- 2) Employees working in areas where there is a danger of foot injuries due to falling or rolling objects shall wear safety footwear that is compliant with at least one of the following standards: ANSI 241, American Society for Testing and Materials (ASTM) F2412, and/or ASTM F2413.
- 3) Employees shall use appropriate hand protection when exposed to hazards from skin absorption of harmful substances, severe cuts or lacerations, abrasions, punctures, chemical burns, or temperature extremes. One type of glove will not work in all situations. In selecting gloves for chemical protection, the exact chemicals encountered need to be determined. Labels and Safety Data Sheets (SDSs) can provide this information. For guidance, contact the GBR Safety Department or refer to the GBR Glove Information Matrix within the PPE Procedure GBR-HESS-PPE-1.
- 4) All employees shall wear a hard hat meeting ISEA 289.1 criteria when there is a danger from impact and/or penetration from falling objects in any work location. Bump caps do not comply with the ANSI guidelines and are not acceptable for applications where OSHA requires an ANSI-compliant hard hat.
- 5) For more information on hearing protection, contact the GBR Safety Department or refer to the Hearing Conservation Program GBR-HESS-PPE-8
- 6) For additional information on appropriate respiratory protection, contact the GBR Safety Department or refer to the Respiratory Protection Program GBR-HESS-PPE-5.
- 7) Specialized personal protective equipment for Alky Unit operations approved for use by the GBR Safety Department is specified in the Alky PPE Matrix RSP-1129-020.
- 8) Only trained E&I technicians or their designee are allowed to work on electrical equipment. The Electrical Safe Approach Distances & PPE Selection Matrix was written based on the requirements of NFPA 70E. All technicians shall consult the Electrical Safe Work Practices RSP-1162-000 before beginning work.