

BP OIL -- TOLEDO REFINERY

Document Type: Procedure	Refinery Wide	Procedure No.: SAF 033
Effective Date: May 2, 2016	Inert Entry	Revision No.: 1
Owner: Stephanie Sedlak	Authorized By: Chris Conley	Page 1 of 20

SCOPE	This policy applies to all BP and Contract employees performing work in and around an area where inert entry work is being performed.
HEALTH Special PPE & Special Hazards	Inert entry tasks involve entering confined spaces that are oxygen deficient and a known IDLH Atmosphere. No BP Employee is permitted to enter an inert atmosphere.
SAFETY	Chemical and physical hazards exist when completing inert entry into confined spaces. These hazards include IDLH atmospheres due to nitrogen in a confined space, pyrophoric hazards, and catalyst dust.
REFERENCE DOCUMENTS	<p>API Standard 2217A -- Guidelines for Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries</p> <p>SAF-032 – Confined Space Entry</p> <p>SAF-023 – Using Direct Reading Gas Testing Equipment</p> <p>SAF-026 – PPE Policy</p> <p>SAF-033-FM- 01 – Inert Entry Confined Space Permit</p> <p>SAF-037 – Lock Out/Tag Out Procedure</p> <p>SAF-086 – Use of Nitrogen</p> <p>SAF-109 – Respiratory Protection Program</p> <p>SAF-116 – Barricading of Hazardous Activities</p> <p>COW-PRO-002 – Control of Work Policy</p> <p>OSHA Standards – 29 CFR 1910.132, 134, 146, 147, 1000, 1200</p> <p>BP Technical Group Hydroprocessing Handbook</p>
SPECIAL MATERIALS & EQUIPMENT	Supplied airline respirators, life support helmets, breathing air monitoring systems, video recording systems, speciality gas testing equipment

QUALITY	Nitrogen quality must be maintained during inert entry activities.
ENVIRONMENTAL	Catalyst removal generates waste. Environmental policies are required to be followed.

<p>1.0 Definitions</p>	<p>BP Contact – An individual designated by BP to be the point of contact between the Specialty Contractor and Operations. This individual must be clearly identified and is typically a maintenance Supervisor (Performing Authority) or TAR staff member.</p> <p>Confined Space – Any space large enough and so configured that an employee can enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy.</p> <p>Entry Supervisor- The person responsible for determining if acceptable entry conditions are present at a confined space where entry is planned, for authorizing entry, overseeing entry operations, and for terminating entry. The duties of entry supervisor may be passed from one individual to another during the course of an entry operation. These responsibilities also may be transferred between the owner and contractors.</p> <p>Hazardous Atmosphere – An atmosphere that may expose employees to the risk of injury, incapacitation, acute illness, impairment of ability to self-rescue (to escape unaided from a confined space), or death.</p> <p>Hot Zone – The area around the entrance to the inerted confined space most likely to be affected by effluent gases; sometimes called the “restricted area.”</p> <p>Inert Entry – Entry into a confined space with an inert atmosphere starts as soon as any part of the entrant’s body breaks the plane of an opening into the space and triggers the need for rescue capability. “Entry” includes all subsequent activities in the inert confined space.</p> <p>Inert Entry Watch/Top Side Attendant – This is an authorized and trained representative from the Specialty Contractor who will watch and monitor the entrant working in an inert atmosphere. The Inert Entry Watch will be required to wear the same PPE as the person making the inert entry.</p>
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	<p>Immediately Dangerous to Life or health (IDLH) -- The maximum concentration of an air contaminant from which one can escape without experiencing any escape-impairing or irreversible health effects. Total loss of respiratory protection in an inert atmosphere can cause virtually immediate impairment and result in rapid asphyxiation and death.</p> <p>Life Support Unit (LSU) – The Life Support Unit is a module that is staged in the unit where all inert communications, monitoring, videotaping and data collection takes place. Staging of the LSU will be decided by BP Operations and the Specialty Contractor.</p> <p>Nitrogen (N2) Purge –The process of introducing nitrogen into a reactor or vessel for the purpose of eliminating oxygen, thereby preventing combustion.</p> <p>Nitrogen Supply Contractor – External party that supplies a source of nitrogen</p> <p>Oxygen Deficient Atmosphere -- an atmosphere in which the oxygen (O2) content is below that needed for normal human function without impairment (below 19.5% O2).</p> <p>Risk Assessment –Systematic examination of a task in order to identify all hazards, assess all risks, and identify safe methods of work to ensure that the hazards are eliminated or the residual risks are minimized. This is completed as an element of the Control of Work Program.</p> <p>SDS – Safety Data Sheet</p> <p>SIMOPS (Simultaneous Operations) –Other jobs or operations in the vicinity of the work, including members of your own work group, which may affect or be affected by the hazards of a task</p> <p>Specialty/Catalyst Contractor – Contracted by BP to perform activities in oxygen deficient vessels or reactors</p> <p>Pyrophoric– A material (e.g. iron sulfide, certain catalysts or certain carbonaceous materials) that, when exposed to air, can spontaneously oxidize and heat, providing a source of ignition if a flammable vapor/air mixture is present.</p>
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<p>2.0 Nitrogen Purge</p>	<p>__2.1 Operations has responsibility for establishing a nitrogen purge on the inert entry space.</p> <p>__2.2 Primary nitrogen supply to the vessel may be sourced from the plant nitrogen system or an independent supply (usually truck). The primary source of nitrogen will be a joint decision between Technical Engineering and Operations.</p> <ul style="list-style-type: none"> ○ The Reformer 3 Dedicated Nitrogen System cannot be used for anything other than maintaining the nitrogen bubble between the reactor and regen. No connections to the Reformer 3 Dedicated Nitrogen System can be made for any other purpose, including inert entry activities. <p>__2.3 A back up nitrogen source must be available in the case that primary supply is lost. The plant nitrogen system cannot serve as both the primary and backup supply for the same vessel.</p> <p>__2.4 A Quality Assurance Plan for the source nitrogen must be established by technical engineering prior to beginning inert entry activities. This can be documented as part of the Level 2 Risk Assessment and should include methods for collecting samples, acceptable limits, and frequency of samples.</p> <p>__2.5 A relief valve must be present on the nitrogen truck lines to prevent overpressure.</p> <p>__2.6 Ensure that internal pressure of the inert confined space is not increasing because of the inerting gas. (bottom measurements and observation of back pressure can be used in most cases since inert gas is often introduced at the bottom of the vessel and flows out the top).</p> <ul style="list-style-type: none"> a. A back pressure test must be performed when nitrogen is being introduced through the bottom of the reactor. <p>__2.7 Control of all nitrogen supply valves to the inert space will be transferred to the Specialty Contractor. The Specialty Contractor must tag these valves with legible, substantial tags that clearly indicates who is in control of the valve.</p>
<p>3.0 Isolation, Lock Out/ Tag Out, and Permitting</p>	<p>__3.1 Inert entry requires positive isolation of the confined space, other than the nitrogen supply.</p>

	<p>__3.2 The refinery isolations practice shall be adhered to.</p> <p>__3.3 The Specialty Contractor may use their own Lock Out/ Tag Out locks and program provided that it meets or exceeds OSHA regulations. The Specialty Contractor will place a blue foreman’s lock onto the operations lock out point (key).</p> <p>__3.4 The BP Performing Authority, Specialty Contractor Supervisor, and BP Safety Advisor are required to walk down the isolation plan prior to authorizing inert entry.</p> <p>__3.5 SAF-033-FM-01 Confined Space Entry Permit for Inert Entry will be issued in place of a standard Confined Space Entry Permit while Inert Entry is taking place. A defined representative from the Specialty Contractor will serve as the Entry Supervisor. The Specialty Contractor will maintain their own Confined Space Entry documentation(sign in/out logs and gas testing results)</p> <p>__3.6 A standard Confined Space Entry Permit will be issued and isolations re-verified if the vessel will be turned over to regular atmosphere for entry.</p>
<p>4.0 Ignition Sources and Tools</p>	<p>__4.1 All lights, tools, and cameras used in the confined space must meet the area electrical classification.</p> <p>__4.2 Any air driven tools used in an Inert Confined Space will be driven from nitrogen, not air.</p>
<p>5.0 Atmospheric Conditions</p>	<p>__5.1 Atmospheric conditions within the inert entry confined space must be maintained within the following limits:</p> <ul style="list-style-type: none"> ○ Oxygen – 0% - 4% ○ Lower Explosive Limit (LEL) - <10% ○ CO - <50ppm ○ Hydrogen Sulfide - <10ppm ○ Ambient Temperature - <100°F <p>__5.2 If any of the above limits are exceeded or the temperature in the inerted space increases 5°F in 15 minutes, an evacuation of the space is required.</p> <p>__5.3 Initial gas testing of the inert entry confined space will be performed by the Specialty Contractor and observed by a BP Safety Advisor (must also be a Level 1 Authorized Gas Tester). This must include Oxygen, LEL, CO, and H2S.</p>

	<p>The BP Safety Advisor will sign the initial gas testing result on the Entry Permit. The BP Safety Advisor is required to confirm the Specialty Contractor is utilizing acceptable gas testing equipment for the inert atmosphere and the device is within calibration.</p> <p>__5.4 Continuous gas testing of the space is required. All continuous gas testing must be performed with the entrants. The tubing on the gas detection devices must be sufficient to test the atmosphere at the elevation the entrants are located.</p> <p>__5.5 The Specialty Contractors logged gas testing readings will serve as the entry gas testing results after the initial test.</p> <div style="border: 1px solid black; background-color: #e0e0e0; padding: 5px; text-align: center;"> <p>WARNING</p> </div> <p>Specialty gas detection equipment is required for use in inert atmospheres. Contact the Safety Department for these instruments. The MSA Altair, Sirius, and BW Micro 5 cannot be used for the testing. (exception exists for the Altair with dilution fitting)</p> <p>__5.6 Continuous atmospheric temperature monitoring must be in place by the Specialty Contractor.</p> <p>__5.7 Any use of TI's to monitor temperature is governed by the hydroprocessing handbook: Attachment 21 - Reactor Temperatures for Entry. The unit process engineer should provide input to the Level 2 Task Risk Assessment on this subject as it varies depending on the vessel.</p>
<p>6.0 Breathing Air Supplies</p>	<p>__6.1 The Specialty Contractor is responsible for all breathing air supplies, equipment, testing, monitoring, and inspection outlined in this section.</p> <p>__6.2 The minimum respiratory protection requirements for inert atmosphere entrants and the top side attendant are:</p> <ul style="list-style-type: none"> ○ Two (2) completely independent continuous air supplies and one secondary emergency egress air supply bottle. ○ Lock-on life support helmet equipped with communication ability. This equipment will meet NIOSH, MSHA, or other equivalent standards. ○ All umbilical lines (breathing air and

	<p>communication) must be shielded from damage by a sufficient protective coating/sheath such as PU (UDF 20430) or an equivalent method.</p> <ul style="list-style-type: none"> ○ Primary air pressure monitor for each individual wearing helmet with audible and visual alarms to indicate low primary supply and regulated pressure ○ A secondary air pressure monitor for each individual wearing a helmet, including an alarm indicating the cut-in of the secondary supply to any of the helmets and to alarm to indicate a low supply pressure. <p>__6.3 All umbilical lines being run to elevation will be secured as much as feasible to minimize movement of the lines due to wind.</p> <p>__6.4 A battery-fed power supply must be equipped to cut in automatically on failure of the electrical supply to the breathing air monitoring system.</p> <p>__6.5 The Specialty Contractor will complete a documented pre-use inspection to ensure physical integrity and cleanliness of equipment.</p> <p>__6.6 Refinery air systems shall not be used to supply breathing air.</p> <p>__6.7 The Specialty Contractor must continually monitor the air supply of the workers in and near the confined space. This person is responsible for ordering the evacuation of the space if the breathing air system is compromised or goes into an alarm state.</p> <p>__6.8 The Specialty Contractor will ensure that purchased breathing air meets, at a minimum, Quality Verification Level D (formerly called Type I, Grade D), breathing air.</p> <p>__6.9 The Specialty Contractor shall train and fit test all employees on the use of respiratory protection equipment in a manner that meets or exceeds OSHA requirements. Training records and fit test records must be made available upon arrival on site to perform work. The BP contact will review these records.</p>
<p>7.0 Logs and Video Monitoring</p>	<p>__7.1 The Specialty Contractor is required to provide a copy of their log at the end of each shift to their designated BP Safety Advisor. The following information must be</p>

	<p>included at a minimum:</p> <ul style="list-style-type: none"> ○ Entry and exit dates/times of all personnel ○ Gas testing results for Oxygen, LEL, CO, H₂S, and ambient temperature every 15 minutes. ○ Catalyst bed outages and conditions every hour ○ Any changes to catalyst removal methods or tools ○ Any changes to how nitrogen is being supplied to the reactor, including flow rates. ○ Any evacuations of the space due to changes in atmospheric conditions or safety concerns <p>__7.2 The Specialty Contractor must have video surveillance and recording capability. Recordings must be made available to BP upon request and retained by the Specialty Contractor for 30 days following the inert entry.</p> <p>__7.3 The Specialty Contractor will perform a recorded video sweep (360°) around the current work location of the entrant every hour.</p>
<p>8.0 Internal Work Practices</p>	<p>__8.1 The Specialty Contractor will have a work practice in place to prevent the engulfment of the entrant in catalyst.</p> <ul style="list-style-type: none"> ○ The Specialty Contractor shall never allow the catalyst wall height to exceed 3' or waist height of the entrant, whichever height is lower, relative to the lowest level of the catalyst bed. ○ The Specialty Contractor shall never allow catalyst to build up on walls or structures or in a manner that they could collapse and engulf or injure the entrant. ○ Entrants shall not leave the hard ladder nor stand on any portion of the bed if a waist high differential in the bed's height exists. <p>__8.2 Entrants into the inert space will be rotated at a frequency not to exceed 4 hours.</p> <p>__8.3 If a cable/rope ladder is going to be used in place of a hard ladder it must be documented in the Level 2 Task Risk Assessment. The ladder must be secured at each tray and the bottom of the vessel.</p> <p>__8.4 The Specialty Contractor must assign a trained individual to monitor the following items continuously:</p> <ul style="list-style-type: none"> ○ Breathing air supply ○ Gas detection readings

	<ul style="list-style-type: none"> o Communications from entrant and top side attendants o Radio channel 16A and the operations radio channel (must have 2 BP radios) <p>__8.5 When sock loading the length of the sock cannot exceed 25 feet. The sock and associated equipment must be protected from falling into the vessel.</p> <p>__8.6 The Specialty Contractor will submit their procedure for securing the sock and associated equipment from falling into the vessel. The BP contact will review these procedures and approve them or require added controls. These added controls will be documented as part of the Level 2 Risk Assessment.</p>
<p>9.0 External Work Practices</p>	<p>__9.1 The Specialty Contractor is required to present a plan that includes their barricading procedure to control access to the work area. This includes work at grade, at heights, and establishing the “hot zone” on the top side of the vessel.</p> <p>__9.2 The restricted work areas will be established and monitored by the Specialty Contractor. Signs will be posted that clearly warn that nitrogen is present.</p> <p>__9.3 The Specialty Contractor will define areas that require respiratory protection, including catalyst handling work at grade.</p> <p>__9.4 Individuals that are loading catalyst into open containers under a nitrogen purge will be required to utilize airline respirators. (see diagram in Process Safety Booklet Ten: Hazards of Nitrogen and Catalyst Handling)</p> <p>__9.5 All employees that are on the top side of vessel and outside of the “hot zone” or handling nitrogen blanketed catalyst at grade will be equipped with an oxygen monitor in addition to other required personal gas detection equipment.</p> <p>__9.6 The requirements of SAF-116 – Barricading of Hazardous Activities must be adhered to by all personnel involved in the inert entry or working in the area.</p> <p>__9.7 All spent catalyst and PPE waste must be handled per site</p>

	<p>environmental policies.</p>
<p>10.0 Additional Hazards</p>	<p>__10.1 Engineering practices and sampling during vessel shut down and preparation must account for the monitoring of formation of nickel carbonyl [Ni (CO)₄]. This is done by monitoring for Carbon Monoxide. Nickel carbonyl is formed by the reaction of carbon monoxide with nickel and is extremely toxic when inhaled.</p> <p>__10.2 Loading of catalyst that is pre-sulphurised, pre-sulphided or pre-activated catalysts that are classified as self heating must be done under inert atmosphere.</p> <p>__10.3 The following potential hazards could exist and should be considered for documentation in the Level 2 Task Risk Assessment (L2TRA):</p> <ul style="list-style-type: none"> ○ Catalyst beds not supporting workers weight ○ Hot spots inside catalyst bed ○ Dumping operations impacting stability of catalyst bed and creating voids ○ Pyrophoric material ○ Elevated temperatures can cause heat stress or fatigue ○ Sharp or abrasive objects/surfaces on trays, lugs, brackets, internal supports ○ Cluttered or obstructed work space caused by poor housekeeping ○ Congestion at job site caused by life-support lines and personnel in area ○ Weather enclosures over entry points to an inert vessel could become oxygen deficient ○ Unauthorized personnel in the area ○ Lighting levels ○ Adverse weather conditions ○ Dropped/falling objects
<p>11.0 Rescue and Emergency Response</p>	<p>__11.1 The Specialty Contractor will provide written rescue and emergency response plans, specific to the inert entry taking place.</p> <p>__11.2 The Specialty Contractor will be responsible for initial confined space rescue efforts to include removing entrants from the space and the hot zone. If the Specialty Contractor has the training and equipment to complete a full rescue to grade, they will include that aspect in their plan.</p>

	<p>__11.3 A winch will be immediately available to remove the entrant from the space.</p> <p>__11.4 The BP onsite confined space rescue team is available on radio channel 16A and must be immediately notified if the Specialty Contractor initiates any type of rescue or emergency response effort.</p> <p>__11.5 The BP onsite confined space rescue team will be available to assist the specialty contractor in removal of a patient from the top side of the vessel to grade.</p> <p>__11.6 The BP onsite confined space rescue team will provide a rescue plan to supplement the Specialty Contractor's plan, as appropriate.</p> <p>__11.7 The Specialty Contractor is required to provide individuals trained to meet or exceed OSHA standards for all rescue operations that they have pre-planned to perform. These training records must be made available to BP upon arrival on site to perform work. The records will be verified by the BP Contact.</p> <p>__11.8 The Specialty Contractor will ensure that their plan accounts for the staging of appropriate personnel and equipment to respond in the case of an emergency.</p>
<p>12.0 Pre-planning and Responsibilities</p>	<p>__12.1 The BP Contact is responsible for:</p> <ul style="list-style-type: none"> ○ Ensuring the Specialty Contractor has received a copy of this procedure, other applicable site procedures, and applicable SDS sheets prior to entry taking place, preferably before arrival on-site. ○ Ensure that the Specialty Contractor's work plans and emergency response plans are received by BP and a copy provided, for review, to a BP Safety Advisor ○ Review documents provided by the Specialty Contractor. ○ Ensure that the Specialty Contractor is supplied with at least 2 BP radios. ○ Must remain on-site for duration of inert entry activities. <p>__12.2 Operations is responsible for:</p> <ul style="list-style-type: none"> ○ Ensuring that the vessel has been properly

prepared for entry and isolated from all energy sources.

- Issuing the final authorization for inert entry to begin by issuing Control of Work permits and the authorization of the Confined Space Entry Permit.
- Issuing a new Confined Space Permit and verifying isolation is still adequate if the vessel will be turned over to regular atmosphere for entry following inert entry.

__12.3 The BP Safety Advisor is responsible for:

- Verifying the isolation of the vessel, review of the Specialty Contractor's plans and procedures, and administration of the Inert Entry Safety Work Assurance program.
- Witnessing the initial gas test and signing the initial entry gas test on the Confined Space Permit.
- Witnessing the initial gas test on the vessel if it is going to be turned over to regular atmosphere for entry following inert entry.
- Must remain on-site for the duration of confined space entry.
- The responsibilities of a BP Safety Advisor for purpose of Inert Entry may be delegated to the following individuals with approval from the Safety Team Leader:
 - A contractor hired to fill the role of a BP Safety Advisor.
 - A HSSE employee with equivalent training of a BP Safety Advisor.

__12.4 The Specialty Contractor is responsible for:

- Writing and implementing all work and emergency response plans for the duration of the work.
- Reviewing all BP procedures and SDS sheets provided to them and ensuring compliance for the duration of the work.
- Providing required training to their employees and ensuring competence for the job tasks they will be completing.
- Report any changes to job scope, failures of equipment, incident, injury or other unexpected event to their BP Contact immediately. These conditions require work to be stopped for reassessment.
- Monitor the atmospheric conditions in the vessel

	<p>and the wellbeing of their employees for the duration of the task.</p> <ul style="list-style-type: none"> ○ Ensure that minimum nitrogen flow is being maintained to the vessel. ○ Responsible for providing any requested training, certifications, and logs to BP upon request or as defined in this procedure. <p>__12.5 All Level 2 Task Risk Assessments must be completed with representatives from the Specialty Contractor present. This cannot be completed by teleconference and must include a review of the vessel drawing.</p>
<p>13.0 Self-verification</p>	<p>__13.1 The Specialty Contractor will complete the Inert Entry Safe Work Assurance Checklist in Appendix A prior to entry each shift. The sheet that is completed for initial entry must be secured to the Confined Space Entry Permit and reviewed prior to entry by the BP Safety Advisor.</p> <p>__13.2 A BP representative will complete the Inert Entry Safe Work Assurance Checklist in Appendix B at least once a shift. The BP Safety Advisor will coordinate this process. The following individuals will participate in the completion of the checklist, when assigned:</p> <ul style="list-style-type: none"> ○ BP Safety Advisor ○ Safety Representative acting on behalf of BP ○ BP Contact ○ TAR Event Manager ○ TAR Manager ○ Operations Coordinator ○ Operations Lead (salary or hourly) ○ Area Operator ○ Process Engineer ○ Operations Superintendent <p>__13.3 The reporting process for deficiencies is noted on the bottom of the checklists and must be followed.</p> <p>__13.4 Completed checklists will be returned to the BP Safety Advisor and managed by the Safety Department.</p>
<p>14.0 Deviations</p>	<p>__14.1 Any deviation from these established procedures shall be</p>

	<p>approved through a Management of Change.</p> <p>___14.2 Turnarounds, Special Projects, Greenfield or Brownfield work may be exempt from specific elements of this procedure provided they have a written plan that addresses inert entry activities and meets all OSHA requirements. The exemption from this procedure must be approved by consensus from the HSSE Manager and Operations Manager.</p>
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Revision history

The following information documents at least the last 3 changes to this document, with all the changes listed for the last 6 months.

Date	Revised By	Changes
10/23/2015	S.Sedlak	Initial Release M20151705-001
05/02/2016	S.Sedlak	Removed requirement for an ambient vaporizer on nitrogen trucks, added requirements securing socks during loading, fixed discrepancy regarding catalyst wall heights on checklists, added clarification on who can fill the responsibilities of a BP Safety Advisor, added requirements for BP Contact to review specific documents prior to entry. M20161210-001

APPENDIX A
Confined Space Inert Entry Safe Work Assurance Checklist – Specialty Contractor

Confined Space Inert Entry Safe Work Assurance Checklist Specialty Contractor

Must be completed *prior* to entry each shift and kept in life support trailer.

S = Satisfactory RA = Requires Attention NA = Not Applicable

Name _____	Equipment _____	Date/Shift _____
<p>1. Equipment isolation and entry permits are in accordance with Toledo Procedures _____</p> <p>2. Procedures are in place to identify all persons authorized to enter the inert vessel. _____</p> <p>3. Procedures are in place to prevent unauthorized persons from entering the vessel. _____</p> <p>4. Provisions exist to prevent unauthorized entry into the vessels when there is no activity. (e.g., manway covers, hard barriers at ladder bases, etc...) _____</p> <p>5. All persons entering, or potentially entering (e.g., rescue personnel) the vessel must wear appropriate equipment for working in an oxygen deficient vessel. The minimum expectations:</p> <ul style="list-style-type: none"> • Two(2) completely independent continuous air supplies, and one secondary (e.g., emergency egress air supply of sufficient capacity for escape purposes _____ • Lock-on Helmet mask type respiratory protection _____ • Rescue personnel and equipment must be assembled and ready for use, at the vessel entry points of any vessel with oxygen deficient atmosphere. _____ • Primary and secondary communication devices are present _____ • A full body harness and tripod with retrieval line attached _____ 	<p>6. Procedures and expectations are in place to ensure that at no time will the residual catalyst remain at a level higher than the worker's waist relative to the lowest point of the catalyst bed level. _____</p> <p>7. Video surveillance equipment is in good working condition, with pan adjustments and recording capability. _____</p> <p>9. Fall arrest equipment is tested, secured, and documented. _____</p> <p>10. Gas monitor has been calibrated _____</p> <p>11. Entrants have armored umbilical cords, including air supply and communication lines: _____</p> <p>12. All umbilical's, lighting cords, and other lines must go through the man way in a neat manner so not to interfere with ingress/egress. _____</p> <p>13. Ingress/egress ladder is in good condition and secured appropriately. _____</p> <p>14. Sufficient low voltage lighting is being used and set up in a way that prevents the cords from becoming entangled or compromised. _____</p>	<p>Page 1 of 2</p>

<p>15. Contractor logs will effectively detail:</p> <ul style="list-style-type: none"> • Entry and exit dates and times of all personnel _____ • Catalyst bed outages _____ • The catalyst bed condition (at least once an hour) _____ • Any changes to catalyst removal methods and or tools _____ • Any changes to how N2 is being supplied to the reactor. (I.e: bottom or horse shoe.) _____ • Gas monitoring log confirms <50ppm CO, < 4% O2, < 10% LEL, <10ppm H2S, <100F have been recorded every 15 minutes. _____ • Breathing air cylinder manifold gauge readings monitored and logged. _____ • The contractor is prepared to rotate workers every 4 hours to mitigate fatigue and provide additional evaluation frequently enough to detect emerging hazards. _____ <p>16. Rescue plan is documented and understood by all personnel approved for rescue in the inert atmosphere (e.g., the contractor). _____</p> <p>17. Shift starting toolbox talk has taken place with all crew members _____</p> <p>18. Breathing air cylinders quality assurance has been provided (for CO and O2). _____</p> <p>19. MSDS sheets are available for spent & new catalyst _____</p>	<p>Comments:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Signature _____</p> <p>Title _____</p> <p>Report any RA's to your BP Contact prior to making entry.</p> <p>Keep this document in the life support trailer until BP Safety collects it.</p>
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APPENDIX B
Confined Space Inert Entry Safe Work Assurance Checklist – BP

Confined Space Inert Entry Safe Work Assurance Checklist BP

Must be completed once a shift by a designated BP Employee or delegate

S = Satisfactory RA = Requires Attention NA = Not Applicable

Name _____	Equipment _____	Date/Shift _____
<p>1. Equipment isolation and entry permits are in accordance with Toledo Procedures(verify using CoW paperwork and CSE permit)_____</p> <p>2. Barriers are in place to prevent unauthorized persons from entering the vessel both when the contractor is present and when there is no activity. _____</p> <p>3. Entry Contractor has completed and documented shift self-assessment. _____</p> <p>4. BP Ops is monitoring the closest catalyst bed TI's to the work and has communication with life support trailer (ask the life support attendant to call for the reading). _____</p> <p>5. Temperatures have not exceeded 100F, and if so, entry was suspended(verify by checking log and a conversation with the life support attendant) _____</p> <p>6. Video surveillance equipment is being used to record reactor conditions and catalyst wall height has not exceeded 3' (or waist height) at least every hour. _____</p> <p>7. Rescue plan is documented and understood by all personnel approved for rescue in the inert atmosphere (e.g., the contractor). _____</p>	<p>8. Rescue personnel (C&W) are on-site (call on 16A). _____</p> <p>9. Contractor logs effectively detail:</p> <ul style="list-style-type: none"> • Entry and exit dates and times of all personnel _____ • The catalyst bed outages _____ • The catalyst bed condition (at least once an hour) _____ • Any changes to catalyst removal methods and or tools _____ • Any changes to how N2 is being supplied to the reactor. i.e.: bottom or horse shoe. _____ • Gas monitor has been calibrated _____ • Gas monitoring log confirms <50ppm CO, < 4% O2, < 10% LEL, < 10ppm H2S, <100F have been recorded every 15 minutes. _____ • Breathing air cylinder manifold gauge readings monitored and logged. _____ • The contractor is rotating workers every 4 hours to mitigate fatigue and provide additional evaluation frequently enough to detect emerging hazards. _____ 	

Comments: _____

Print Name: _____ **Signature:** _____ **Title:** _____

Name of individuals spoken with: _____

Return completed assessment to BP Safety Representative.

BP Safety will address any **RA**'s with BP Contact and document corrective actions on back.

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