FREEPORT-McMoRan

FCX Department of Occupational Health and Safety		
	SOP #	FCX-12
	Revision #	3
	Supersedes	2 (5/7/12)
HDPE Pipe Handling Policy	**Task Risk**	**High**
	X	**Medium**
		Low
		NA
Approval Date: 7/18/16	**Original Date: 4/08/11**	

Contents

1.0 Policy

Background	In 2010, a contractor employee working in the mine was installing a section of 24 inch diameter HDPE pipe. An existing 24 inch diameter pipe was being used as a skid to guide the new pipe into position, with the new pipe riding on top of the existing one. The contractor was helping to pull the pipe back to the ground using lifting straps, placing him less than 4 feet away from the pipe being moved and directly in the pipe's path of movement. The pipe impacted the contractor in the upper body. He suffered fatal injuries. Also in 2010, employees were fusing 12-inch diameter HDPE pipe to tie in an existing line. While positioning the pipe for fusion, the stored energy created during the pulling and bending of the pipe resulted in the 12-inch pipe suddenly being projected towards an employee who was standing between the pipe and a piece of equipment. The pipe struck the employee in the face and head, causing serious injuries. As a result of these and other serious incidents with HDPE pipe, this policy has been developed to prevent a similar event from occurring.
Scope	This policy applies to all Freeport-McMoRan employees and contractors who handle HDPE pipe. All Freeport-McMoRan employees and contractors who handle or participate in the handling of HDPE pipe MUST attend the HDPE Pipe Handling training course. This policy does not apply to drip line or corrugated pipe, as neither of these present the same hazards as HDPE pipe.

2.0 Risk Management

Risk Registers	Tasks involving HDPE pipe handling will be listed on divisional risk registers at each site, and an evaluation to reduce or eliminate risk will be completed according to the FCX Risk Matrix.
Safety Watch	**The Safety Watch must remain on the job at all times and have no other job assignments or responsibilities.** If this person must leave the area, there must be positive relief by another Qualified Individual. Requirements for the use of a Safety Watch are determined by the hazards associated with specific tasks, including specific policy requirements.
Load/Move Information	Load/move information for each piece of equipment will be used to assist decisions for safe handling of pipe. This will include site-specific equipment used for pipe handling.
Substantial Barriers	Requirements for the use of a Substantial Barrier are determined by the hazards associated with specific tasks, including specific policy requirements. A Qualified Individual must identify the Substantial Barrier that will be used for the task. A Safety Watch is required when Substantial Barriers are used.
Pipe Pulling Escorts	The Lead Escort and Trail Escort used during a pipe pull must not have any other assignments or responsibilities.
Pipe Guide	Requirements for the use of a Pipe Guide are determined by the hazards associated with specific tasks, including specific policy requirements.
Pushing Pipe	An Engineering Review is required for pushing pipe. Pushing can only be performed by a Qualified Individual.
Stored Energy – Fusing Machines	Stored energy sources must be considered and controlled when loading and unloading pipe from a fusing machine.
Data Logging	Data logging is a tool that assists operators with the pipe fusing process by providing fuse specifications and real-time process information for each fuse. This information helps to increase the likelihood of fuses meeting required specifications. Data logging does NOT guarantee the quality of a fuse.
Preventative Maintenance	A Preventative Maintenance (PM) process will be established for inspection of pipes using each site's existing PM process.

	Inspections shall be performed for issues such as sagging, ground erosion, etc., as well as for the condition of equipment used for pipe handling. Examples include pulling heads, slings, shackles, swivels, etc.
Management of Change	Each site's Management of Change (MOC) system must be considered.
Dual-Walled Pipe	Dual-walled or dual-contained pipe may require different rigging and/or equipment specific to the pipe and task. An Engineering Review is required for these tasks. This applies specifically to pipe manufactured as dual-walled or dual-contained pipe. This does not apply to sleeved pipelines assembled on site.
Variance Request	A Variance Request is required for any HDPE work that falls outside of this policy. Refer to FCX-21 "Global Significant Risk – Variance Process" for additional information.

2.1 Forms and References

All items listed in this section are contained in the Appendices.

HDPE Pipe Handling Permit (Appendix A)	An HDPE Pipe Handling Permit will be completed for any work with HDPE that is 2 inches in diameter or larger AND longer than 50 feet where the pipe will be pulled, installed, and/or repaired. A permit will also be completed for unrolling HDPE pipe coils, regardless of diameter and length. The permit is good for the task duration as long as conditions do NOT change (examples include weather, equipment, pipe size, terrain, slope, project lead, etc.). The permit must be reviewed by all employees associated with the task each time prior to work beginning. Each employee must print, sign, and date the bottom of the permit in the designated area (or the reverse side of the permit) after the permit is reviewed. A permit is NOT required for loading or off-loading of pipe.
HDPE Pipe Handling Engineering Review (Appendix B)	An HDPE Pipe Handling Engineering Review is for specific tasks where the policy covers the general safe practices, but does not cover the details of the engineering. The Engineering Review may be used for the following situations: • Pulling pipe of any diameter that is longer than 400 feet • Pulling pipe up or down grades greater than 25% • Pushing pipe • Tasks involving dual-walled or dual-contained pipe

	• Fusing pipe that is not consistent or without manufacturer specifications or ASTM standards • Pulling or fusing pipe 42” in diameter and greater All manufacturer and company-defined safety standards must be utilized. The details of the engineering review must be attached to the request, or be readily available if an attachment is not practical.
HDPE Pipe Pulling Force Reference (Appendix C)	The HDPE Pipe Pulling Force Reference provides pulling force requirements over a range of pipe diameters and SDR ratings. The pulling forces are based on pulling an empty 400-ft pipeline with a 0.8 coefficient of friction up a 17.5% grade (Table C.1) and up a 25% grade (Table C.2). This appendix is designed to be used in conjunction with Appendix E, listed below.
HDPE Pipe Loading/Unloading Checklist (Appendix D)	An HDPE Pipe Loading/Unloading Checklist will be completed prior to loading or unloading HDPE pipe. The checklist must be reviewed by all employees associated with the task, and sign the checklist in the appropriate locations. An HDPE Pipe Handing Permit is NOT required for loading or off-loading of pipe.
HDPE Pipe Handling Rigging Approval Request (Appendix E)	The HDPE Pipe Handling Rigging Approval Request provides the details of approved rigging used for pulling pipe 12” in diameter and greater. Completed forms for rigging that have been approved are located on the DOHS SharePoint under the HDPE Pipe Handling GSR folder. For rigging that is not in the approved folder, the rigging approval request must be completed and approved prior to use. Rigging that is intended for multiple uses must have the approval request submitted to the Company PSST for approval and inclusion with approved rigging.
HDPE Pipe Handling Illustrations (Appendix F)	The HDPE Pipe Handling Illustrations demonstrate the differences between HDPE pipe pulling, pushing and positioning.

3.0 Procedures

3.1 Receiving, Loading, Off-Loading, and Storage

HDPE Pipe Shipping Requirements	HDPE pipe must be shipped according to the company shipping requirements. These requirements are located in the HDPE Pipe Shipping Requirements document.
HDPE Pipe Loading/Unloading Checklist	The HDPE Pipe Loading/Unloading Checklist must be completed for loading or off-loading HDPE pipe prior to beginning the task. Sites must have an established procedure for ensuring the checklist is completed prior to beginning the task. Arriving loads that are not compliant with the HDPE Pipe Shipping Standards require additional evaluation and superintendent approval prior to off-loading, as indicated on the checklist. This process includes a reporting system for communicating improper loads to GSC.
Safe Zone	A 50 foot Safe Zone around the truck must be established and marked, with a Safety Watch in place to keep ground personnel out of the loading/unloading zone any time the load is not secure. Truck driver must remain with the Safety Watch any time the load is not secure. A Substantial Barrier must be in place for personnel to enter the Safe Zone when the load is not secured. This includes when the load is being strapped or unstrapped. An example of this is using a loader with forks to block the load when unstrapping.
On-Site Transfers	On-Site Transfers require an HDPE Pipe Loading/Unloading Checklist to be completed prior to beginning the task. Site trailers used for on-site transfers of HDPE pipe must be equipped with engineered stints or other engineered means of securing the load.
Off-Site Shipments	A Variance Request is required for pipe being shipped off-site.
Equipment	The site must ensure that equipment has been evaluated for adequate lifting capacity, and that the equipment operator is aware of the limitations of the equipment. Equipment operators must have documented training for the equipment used in the loading/unloading process. Documented rigging task training is required for employees loading/unloading pipe using a mobile crane.

Safe Arrival	Safe arrival of the shipping truck at the unloading site must be coordinated, and trucks will NOT be unloaded until the checklist is completed.
Storage	Without engineered controls, HDPE pipe is to be stored NO MORE than two pipes high for 10 inch diameter and larger, and NO MORE than 2 feet high for pipe smaller than 10 inch diameter. HDPE pipe can be stored higher if there are engineered controls in place to prevent the stack from collapsing.

3.2 Pipe Pulling

Documented procedures will be established for pulling HDPE pipe, in accordance with Policy expectations.

An HDPE Pipe Handling permit will be completed prior to pulling pipe where the pipe is 2 inches in diameter or greater AND longer than 50 feet.

Sites must establish procedures and controls for pulling pipe that is greater than or equal to 2 inches in diameter and less than 12 inches in diameter.

Pushing Pipe	Pulling will be used over pushing wherever possible due to additional hazards created when pushing. If pushing is necessary, an Engineering Review is required.
Restrictions	An Engineering Review is required for pulling pipe of any diameter that is longer than 400 feet. An Engineering Review is required for pulling pipe up or down grades greater than 25%.
Safe Zone	A Safe Zone of 50 feet must be maintained from the pipe when it is being pulled or pushed. Substantial Barriers must be used if any ground personnel must be within the Safe Zone.
Support Equipment	A Lead Escort and Trail Escort are required for pulling pipe in addition to the Pulling Equipment when there is the potential for interaction with other traffic. Equipment used as a Pipe Guide can be within the 50 foot Safe Zone. The equipment must be able to control the energy of the pipe and not present a hazard to the operator or equipment. Blocking is required any time other traffic could enter the path of the pipe pull. Examples of blocking include equipment with an operator blocking the road, or appropriate use of flagging and/or barricading. Only designated Blocking Equipment is allowed to pass the pipe being pulled in order to set up blocks along the path of travel, as long as the pipe is no longer in motion and proper passing communication procedures are followed.

	Two-way traffic is allowed on roads that are wide enough to maintain the 50-ft safe zone around the pipe. Controls must be established to keep the pipe within the lane of travel. Superintendent approval is required for two-way traffic pulls.
Flashing Blue Light	A flashing blue light is required on all equipment involved with pulling pipe where there is the potential for interaction with other traffic. The flashing blue light MUST be easily visible during daylight hours.
Pipe Bending	Pipe bending creates additional stored energy that must be considered when completing tasks to ensure that minimum safe distances are determined, substantial barriers are provided when needed, and appropriate equipment is selected.
Rigging	Once rigging has been used for pulling pipe, it cannot be used for any other tasks other than pulling. Rigging that has been used for pulling cannot be used for lifting. Rigging must be marked to indicate what it has been used for to eliminate any confusion. For HDPE 12 inch in diameter and larger, the site shall use approved pipe rigging as defined in the HDPE Pipe Handling GSR folder on the DOHS SharePoint.. If the desired rigging is not listed there, the HDPE Pipe Handling Rigging Approval Request (Appendix E) must be completed prior to using the rigging. Rigging for pulling pipe that is greater than or equal to 2 inches in diameter and less than 12 inches in diameter must be defined in site procedures. The use of a sling as a “choker” is NOT acceptable for pulling HDPE pipe 12 inches in diameter and larger. This includes pulling lengths of pipe while fusing in a laydown area. It is acceptable to use a sling to lift and position pipe (such as positioning a pipeline in a fusing machine or removing it from the machine).
Pipe Slotting	Pipe slotting (cutting a slot or shape into the pipeline to be used as an anchor point) is NOT acceptable for any pipe pulls regardless of diameter and length.
Equipment	All equipment used for pulling HDPE pipe will meet the pulling force requirements for the pull. Equipment used as a Pipe Guide must be appropriate for the size and potential energy of the pipe.
Pipe Coils	Specific procedures will be developed for tasks involving unrolling HDPE pipe coils of any diameter and length, and an HDPE Pipe Handling Permit will be issued prior to starting work. This procedure must include where the pipe will be staged after it is unrolled, and the controls that will be used to maintain a secure area.

	The process of unrolling HDPE pipe coils up to the staging area is not considered pulling pipe, and is not restricted to the 400 foot maximum length. After the unrolled pipe has been staged, the pipe is subject to the pipe pulling requirements. An engineered device for controlling the stored energy in the coil (such as a Line Tamer) must be used when unrolling coils. There are no restrictions on the length of pipe in a coil to be unrolled.

3.3 Fusing, Installation, and Repair

Documented procedures will be established for fusing, installing, and repairing HDPE pipe, in accordance with Policy expectations.	
HDPE Pipe Handling Permit	An HDPE Pipe Handling Permit is required for tasks involving fusing, installation, and/or repair for HDPE 2 inches in diameter and greater where the final result of the task creates a pipe longer than 50 feet.
Hazard Boundary	The area in which task hazards exist must be reviewed and defined. This review must include the need for any boundary markings. Anyone who is inside this area will review and sign the completed HDPE Pipe Handling Permit to ensure all personnel are aware of the hazards. Additional review may be needed if there is more than one task taking place on the same pipeline.
Significant Bends	A Qualified Individual must review tasks involving cutting pipe with significant bends. A pre-job safety meeting will also be held to discuss hazards and precautions, and to determine safe distances, substantial barriers, and adequate equipment to perform the task safely.
Banding Clamps	It is important to remember that banding clamps are NOT designed to splice the ends of two pipes together, and cannot prevent axial pipe movement. These pipes should be fused or secured with a coupling designed for this application.
Specifications and Standards	Manufacturer specifications and applicable ASTM standards for fusing must be followed at all times. If the specifications cannot be followed, or they do not exist for the pipe being used, an Engineering Review is required. This includes the use of recycled HDPE pipe.
Data Logging	Data logging is required on all HDPE pipe fuses 12 inches in diameter and greater.

Data logging on HDPE pipe at smaller diameters is at site discretion, and should be considered in critical areas (such as high pressure installations, long-term installations, etc.).

Data review process is at the discretion of each site.

If a data logger cannot be used where required, a Variance Request must be completed.

4.0 Training

All employees and contractors who handle or participate in the handling of HDPE pipe must be trained on this policy.

Training shall include the hazards associated with the handling of HDPE pipe, and how to effectively complete the forms associated with the policy.

Training Format	Training will be interactive and consist of classroom, video, and/or field demonstration of the task. Employees must demonstrate competency (both verbal and visual) to assess understanding. Existing site documents and skills assessment formats may be utilized, but must include the skills listed in the FCX Skills Assessments.
Documentation	All training will be documented, including a training matrix with employee skills kept and readily available/accessible.
Refresher Training	All employees trained on this policy must receive refresher training every year.

4.1 Key Elements

At a minimum, the training will include the key elements listed in this section.

Elements	• Use of the HDPE Pipe Handling Permit. • Determination of safe distances to position employees from pipe during movement or after movement and proper use of substantial barriers. • Review by a qualified individual of piping that is found to contain residue or solution. • Specific rigging task training for pipe handling and pulling. • Off-loading, loading, and storage of HDPE pipe. • HDPE pipe pulling and handling. • Fusing HDPE pipe. • Inspections of pipe and prevention of hazards and failures. • Incident review and potential hazards and problem areas. • Mobile equipment used for HDPE pipe handling.

4.2 Skills Assessments

Skills Assessments will be used for determining qualified individuals on a task-basis.

Sites will utilize site specific training as well as the skills assessments developed by the PSST to evaluate individuals and verify competency prior to working with HDPE pipe.

Skills shall include hazard identification, hazard control procedures, and safe operation of equipment.

Skills assessments will be utilized to qualify individuals to train/mentor others, perform tasks, and complete permits for the areas listed below.

Assessments	• HDPE Pipe Handling Guidelines • HDPE Pipe Handling Permit • General Equipment HDPE Pipe Handling • General Pipe Selection and Identification • HDPE Pipe Unlaoding, Loading, and Storage • Pulling Pipe • Rigging Equipment • Pipeline PM and Inspection • HDPE Pipe Unrolling • Flow Isolation and Distribution • Fusing and Fusing Equipment

5.0 Definitions

HDPE	High-Density Polyethylene
On-Site Transfer	Moving HDPE pipe internally/within the site using a trailer after it has been received from the orginal shipper.
Pipe Guide	Equipment or material used to maintain control of the pipe while being moved. The guide must not present a hazard to the operator or equipment.
Project Lead	A person that is intimately familiar with the task. This could be a supervisor, engineer leading the project, or other Qualified Individual.
PSST	Pipe Safety Steering Team A team comprised of representatives from each area/site affected by this policy. A company team oversees the policy for each FCX business unit, and a site team ensures best practices are being followed at each site.
Qualified Individual	An employee that through training and experience is familiar with the operation and safety hazards of the task, and has been qualified using the applicable skills assessment.
Safety Watch	A Qualified Individual who is assigned to monitor a task and stop work if anyone places themselves in a potential line of fire.
Spotter	A person assigned to assist or direct flow of work for someone performing a task, such as unloading or moving pipe.
Substantial Barrier	An object used for controlling the energy in the pipe to protect personnel that must be within the 50 foot safe zone. Examples include dirt berms, concrete barriers, properly placed equipment, etc.

6.0 Monitoring and Control

The company Pipe Safety Steering Team (PSST) will evaluate existing standards, set new guidelines, and monitor site performance.

6.1 Company PSST

Members	The company PSST will consist of: Sponsor – Manager, GM, or Director Level Lead – Superintendent or Manager Level Site Champions Global Sourcing Representative Health and Safety Representative Engineering Representative Training Representative
Site Visits	The company PSST will conduct annual site visits at each branch to monitor compliance, look for best practices, and provide feedback for improvement. Site visits will include compliance with this policy, training, procedures, and field practices.
Meetings	Quarterly meetings will be held with all members to review practices and make recommendations for change where needed. Changes to the current policy and appendices must go through a formal approval process with the company PSST and be brought back to site teams for implementation.

6.2 Site Teams

Members	Sites that regularly handle HDPE pipe will establish a Site PSST, consisting of: The Site Champion (member of the company PSST) Engineering Representative Global Sourcing Representative Health and Safety Representative Representative from Each Affected Area
Low-Frequency Usage Sites	Sites that handle HDPE pipe on a minimal basis or as part of short duration projects will utilize expertise from other sites to assist with review of the project and implementation of the policy prior to work commencing.
Field Audits	Site Teams will conduct field audits to ensure pipe handling practices are being followed, and to identify any improvement opportunities. These audits will take place at minimum once per quarter.

Project Managers	Project managers will audit work practices of contractors that perform HDPE pipe tasks to ensure compliance with site HDPE pipe procedures and this policy.
Supervisor Expectations	Supervisors at each site will be responsible to ensure that practices are being followed.

7.0 Records

The following records must be retained according to the FCX Records Retention Policy	• HDPE Pipe Handling Permits • HDPE Pipe Handling Engineering Reviews • HDPE Pipe Loading/Unloading Checklists • HDPE Pipe Handling Rigging Approval Requests

8.0 Revision History

2011 Rev 1	Initial Release	
2012 Rev 2	This update includes	1. Corrects errors in the previous version 2. Clarifies "Hazardous Atmosphere" and "Acceptable Entry Conditions" 3. Encourages operations to use their Hazard Identification / Risk Analysis / Determination of Controls process with confined space entry 4. Clarifies links with other FCX guidance documents 5. Clarifies entries involving conditions that are Immediately Dangerous to Life or Health 6. Clarifies expectations on emergency response training, capabilities, and drills for internal CS rescue teams 7. Clarifies expectations for sites that rely on external confined space rescue resources 8. Clarifies retrieval lines (used for non-entry rescue) and lifelines (used to protect and entrant from engulfment hazards)
2016 Rev 3	This update includes	HDPE Pipe Handling Guidelines are now HDPE Pipe Handling Policy 1. Background contains minor changes to clarify understanding. 2. Scope describes requirement for all FMI employees and contractors to attend HDPE Pipe Handling Training. Scope does not apply to corrugated pipe or drip line. 3. Definitions moved to section 5 of new policy. 4. Pipe Handling Permit requirements moved to section 2.1 Forms and References. 5. Safety Watch requirements and responsibilities clarified. 6. Load/move information will be used to when handline pipe. Load/move chart is not required. 7. Substantial barrier requirements clarified. 8. Pipe pulling escort requirements. 9. Pipe guide requirements. 10. Pushing pipe requirements. 11. Fusing machine stored energy requirements. 12. Data logging defined. 13. Preventive maintenance requirements clarified. 14. Management of change considerations. 15. Dual-walled pipe requirements. 16. Variance Request requirements. 17. Section 2.1 describes all "Forms and References", these are contained in appendices. 18. HDPE Pipe Handling Permit (Appendix A), detailed. 19. HDPE Pipe Handling Engineering Review (Appendix B), detailed. 20. HDPE Pipe Pulling Force Reference (Appendix C), detailed. Reference now covers grades to 25%. 21. HDPE Pipe Loading/Unloading Checklist (Appendix D), detailed. 22. HDPE Pipe Handling Rigging Approval Request (Appendix E), detailed. 23. HDPE Pipe Handline Illustrations. 24. Procedures 25. Receiving, Loading, Offloading, and Storage. 26. Shipping requirements detailed. 27. HDPE Pipe Loading/Unloading Checklist detailed. 28. Safe Zone requirements defined. 29. On-Site transfers detailed. 30. Off-Site shipments will require a Variance Request. 31. Capability of equipment used to load/unload pipe must be evaluated. 32. Storage practices detailed. 33. An HDPE Pipe Handling Permit is required to pull pipe 2" in diameter or larger and longer than 50 feet. 34. Pushing pipe – pull rather than push pipe whenever possible and utilize an engineering review when pushing pipe. 35. Restrictions – an Engineering review is required to pull over 400 feet of pipe and to pull on grades greater than 25%. 36. Safe Zone of 50 feet shall be maintained when pushing or pulling pipe. Substantial barriers shall be used if 50 foot safe zone cannot be maintained. 37. Support Equipment – details the practices for pulling pipe on roadways and in traffic. 38. Flashing Blue Light – flashing blue lights shall be used on equipment used to pull pipe where

there is interaction with other traffic.

39. Pipe bending cautionary practices.
40. Rigging use and practices.
41. Pipe slotting is not an acceptable practice.
42. Equipment used in pipe work must be sized appropriately.
43. Pipe coils require specialized equipment and procedures.
44. Fusion, Installation, and Repair require documented procedures.
45. HDPE Pipe Handling Permit use requirements.
46. Hazard Boundary detailed.
47. Significant Bend personnel requirments and precautions.
48. Banding Clamps are not designed for splicing and are not a substitute for fusing.
49. Specifications and Standards from manufacturers shall be utilized.
50. Data Logging shall be used on HDPE pipe 12" and greater.
51. Training – FMI and contractors must be trained on this policy. Training will include hazards associated with handling HDPE Pipe and forms associated with the policy.
52. Training format and inclusions.
53. Training documentation.
54. Training will require an annual policy refresher.
55. Key elements of HDPE training listed.
56. Skills Assesments shall be used to determine individuals qualified to handle HDPE Pipe.
57. Areas covered in skills assesments.
58. Definitions.
59. Company PSST team makeup, visits and meetings detailed.
60. Site PSST team makeup, audits and expectations detailed.
61. Records requirements.

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Appendix A – HDPE Pipe Handling Permit

FREEPORT-McMoRan	HDPE Pipe Handling Permit *Appendix A*	*Permit Expiration Date:*

Before completing this permit, it is necessary to thoroughly review applicable policies and SOP's with all affected employees to ensure concrete understanding. Think carefully about the entire task to identify, evaluate, and control all energy sources to prevent incidents.

Request Date	Qualified Individual	Department / Shop	Location	Equipment Being Used for Task

Pipe Specifications	*Pipe Pulling Information*	Description of Task / Purpose of Permit
Diameter:	Length:	
SDR:	From:	
Contents:	To:	

Pre-Job Hazard Analysis Section

1. General Hazard Analysis	**Yes**	**No**	**N/A**
Are all personnel working on this task properly trained to perform the task?	☐	☐	
Does notification need to be given to all affected areas/departments?	☐	☐	☐
List Areas/Departments:			
Is the pipeline buried, or is any earth work needed?	☐	☐	
Is a Bluestake Permit required?	☐	☐	
Is a Hot Work Permit required?	☐	☐	
Are substantial barriers required to protect personnel, and if so are they adequate for this task?	☐	☐	
Have all energized/pressurized lines near the work area and/or along the travel path been identified and controlled?	☐	☐	☐
List Pressurized Lines / Active Pipelines and Controls Used:			
List Energized Lines / Power Lines (including Overhead) and Controls Used:			
Have the contents of the pipe been identified, and appropriate Safety and Environmental actions taken?	☐	☐	☐
Has the pipeline been isolated?	☐	☐	☐
List LOTOTO Points:			
Have all cut points been clearly identified by a qualified individual?	☐	☐	☐
Will cutting the pipe release any stored energy?	☐	☐	☐
If yes, list controls:			
Is a Safety Watch required for this task?	☐	☐	

2. Pipe Pulling Analysis ☐ *Check if section is N/A*	**Yes**	**No**
Has appropriate rigging been identified for this task?	☐	☐
Has the travel path been identified and communicated with pulling team?	☐	☐
Does the pipe length or travel path require spotters or blockers?	☐	☐
Does the travel path create any bends in the pipe?	☐	☐
If yes, list controls:		

3. Fusing/Installation/Repair Analysis ☐ *Check if section is N/A*	**Yes**	**No**	**N/A**
For multiple crews working on the same pipeline, is the energy controlled between crews?	☐	☐	☐
Will loading and/or unloading pipe into the fusing machine create or release any stored energy?	☐	☐	☐
If yes, list controls:			
Has safe access been established to the work area?	☐	☐	☐
Has a work area perimeter been established for the work area?	☐	☐	☐
Has appropriate rigging been identified for this task?	☐	☐	☐
Is a Datalogger connected and working properly?	☐	☐	☐

Qualified Individual - Prior to Starting Task:	*QI Initials (must be completed daily)*
Pre-job safety review has been completed with all employees associated with task	
Notification has been given to all affected areas / departments	
All personnel not involved with the task have been cleared from the area	

4. Energy Source Review			
No	*Yes*	*Hazard*	*Controls*
☐	☐	High Walls or Material at Natural Angle of Repos	
☐	☐	Line of Fire	
☐	☐	Weather (Wind, Heat, Cold, Lightning, etc.)	
☐	☐	Lighting / Illumination	
☐	☐	Material Handling Hazards	
☐	☐	Falls or Falling Objects	
☐	☐	Any Others? *List Here:*	

5. Significant Hazard Analysis	**Yes**	**No**
1. Is the pipeline 12" in diameter or greater?	☐	☐
2. Are there any bends in the pipe that are storing significant potential energy?	☐	☐
3. Is a substantial barrier being used for the task?	☐	☐
4. Will two-way traffic be allowed during a pipe pull?	☐	☐
5. Will the pipeline be pushed into place?	☐	☐
6. Does this task involve dual-contained or dual-walled pipe?	☐	☐
7. Pipe 12" in diameter or greater will be fused without a Datalogger	☐	☐

For above questions answered "Yes"

Questions 1 - 4	Superintendent Signature
Questions 5 - 6	Superintendent Signature + Engineering Review
Question 7	Superintendent Signature + Variance Request

Pre-Job Approval to Begin Work

Qualified Individual (Name and Signature)

Supervisor (Name and Signature)

Superintendent (if required) (Name and Signature)

Employees associated with task - I have reviewed the above permit completely and understand the procedures, hazards, and controls to complete this task safely

(Print, sign, and date within this box or on the reverse side of the page)

Appendix B – HDPE Pipe Handling Engineering Review

FREEPORT-McMoRan	HDPE Pipe Handling Engineering Review *Appendix B*

Please fill out the following form with the reason and the detailed description for the Engineering Review request. Approval from the division manager or higher is required prior to proceeding with the task.

Date:		Division Manager:	
Purpose of Activity:			

Description of Request:

Engineering Review: (engineering must be listed below or attached)

Risk Mitigation / Control Measures:

Approvals:	
Requestor (Name + Signature)	
Reviewing Engineer (Name + Signature)	
H&S Specialist (Name + Signature)	
Area Superintendent (Name + Signature)	
Division Manager (Name + Signature)	

*When completed, give a copy of all related documentation to the division record keeper for filing purposes

Appendix C – HDPE Pipe Pulling Force Reference

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HDPE Pipe Pulling Force Reference

Appendix C

Table C.1 - HDPE Pipeline Pulling Force (17.5% Grade)

Nominal Pipe Diameter (inches)	Pipe SDR Rating									
	32.5	26	21	19	17	15.5	13.5	11	9	7 or 7.3
12	2,600	3,200	4,000	4,400	4,800	5,300	6,000	7,200	8,500	10,500
14	3,200	3,900	4,800	5,200	5,800	6,300	7,200	8,600	10,300	12,700
16	4,100	5,100	6,200	6,800	7,600	8,200	9,400	11,300	13,400	16,600
18	5,200	6,400	7,900	8,600	9,600	10,400	11,800	14,200	17,000	21,000
20	6,400	7,900	9,700	10,600	11,800	12,900	14,600	17,600	20,900	25,900
22	7,700	9,600	11,700	12,900	14,300	15,500	17,700	21,200	25,300	31,300
24	9,200	11,400	13,900	15,300	17,000	18,500	21,000	25,300	30,100	37,300
26	10,800	13,300	16,300	17,900	19,900	21,700	24,600	29,600	35,400	43,612
28	12,500	15,500	18,900	20,800	23,100	25,200	28,600	34,400	41,000	
30	14,300	17,700	21,700	23,900	26,500	28,900	32,800	39,400	47,100	
32	16,300	20,200	24,700	27,200	30,100	32,800	37,300	44,900	53,500	
34	18,400	22,800	27,900	30,700	34,000	37,100	42,100	50,600		
36	20,600	25,500	31,300	34,400	38,100	41,600	47,200	56,700		
42+	Engineering Review Required									

Pulling force exceeds capacity of original six rigging assemblies

* Calculations based on: Pulling empty 400-ft pipeline up 10° (17.5%) slope, assuming 0.8 Coefficient of Friction

Table C.2 - HDPE Pipeline Pulling Force (25% Grade)

Nominal Pipe Diameter (inches)	Pipe SDR Rating									
	32.5	26	21	19	17	15.5	13.5	11	9	7 or 7.3
12	2,800	3,400	4,200	4,600	5,100	5,600	6,300	7,600	9,000	11,200
14	3,300	4,100	5,100	5,500	6,200	6,700	7,600	9,100	10,900	13,500
16	440	5,400	6,600	7,200	8,000	8,700	9,900	11,900	14,200	17,600
18	5,500	6,800	8,300	9,100	10,100	11,000	12,500	15,100	18,000	22,200
20	6,800	8,400	10,300	11,300	12,500	13,600	15,500	18,600	22,200	27,400
22	8,200	10,100	12,400	12,500	15,100	16,500	18,700	22,500	26,800	33,200
24	9,700	12,000	14,800	16,200	18,000	19,600	22,200	26,800	31,900	39,500
26	11,400	14,100	17,300	19,000	21,100	23,000	26,100	31,400	37,500	46,300
28	13,200	16,400	20,100	22,000	24,500	26,600	30,300	36,400	43,400	
30	15,200	18,800	23,000	25,300	28,100	30,600	34,700	41,800	49,800	
32	17,300	21,400	26,200	28,800	31,900	34,800	39,500	47,500	56,700	
34	19,500	24,100	29,600	32,500	36,000	39,300	44,600	53,700		
36	21,800	27,000	33,100	36,400	40,400	44,000	50,000	60,100		
42+	Engineering Review Required									

Pulling force exceeds capacity of original six rigging assemblies

* Calculations based on: Pulling empty 400-ft pipeline up 14° (25%) slope, assuming 0.8 Coefficient of Friction

Notes:

The pulling forces listed here should be used in conjunction with the approved rigging assemblies in the HDPE Pipe Handling GSR folder on the DOHS SharePoint

The pulling forces listed here can also be used when filling out the HDPE Pipe Handling Rigging Approval Request (Appendix E)

Friction factor of 0.80 used in calculations (Sand/HDPE is published at 0.66)

An engineering review is required for pulling pipe on a slope greater than 14º (25%)

Appendix D – HDPE Pipe Loading/Unloading Checklist - External

FREEPORT-McMoRan	HDPE Pipe Loading/Unloading Checklist *Appendix D* *External Receivng*

Date		Inspected By	
BOL #		Load Description	

Part 1 - HDPE Pipe Receiving Checklist

No	Yes	
☐	☐	Load has not shifted and is not leaning
☐	☐	Pipe is loaded and strapped properly according to the HDPE Pipe Shipping Requirements
☐	☐	Proper size dunnage (minimum 4x4) is in place between each layer of pipe with chocks on the ends
☐	☐	Pipe is free from visible defects or damages

NOTE: If the HDPE pipe is not loaded properly or any of the above conditions have not been met (checked "No"), the truck will NOT be released for off-loading. The superintendent for the area receiving the pipe must be contacted immediately for further evaluation.

NOTE: All improper loads must be communicated to the PSST Site Representative and GSC

Received and Approved	

Part 2 - Unloading Checklist

No	Yes	
☐	☐	All operators and safety watches have been task trained
☐	☐	Operator has completed a pre-use inspection card for equipment
☐	☐	Load area is free of other equipment, debris, rocks, holes, etc.
☐	☐	Clear access is established to both sides of the truck
☐	☐	Truck is sitting with wheels level and is chocked
☐	☐	A 50-ft safe zone has been established (or a substantial barrier is put in place)
☐	☐	Safety watch is in place
☐	☐	Driver is with the safety watch
☐	☐	Area where pipe will be placed is inspected

NOTE: Do NOT proceed with unloading if any question above is answered "No"

Signatures Approving Unloading

Driver		*Safety Watch*		*Unloading Crew*	

Appendix D – HDPE Pipe Loading/Unloading Checklist - Internal

FREEPORT-McMoRan	HDPE Pipe Loading/Unloading Checklist *Appendix D* *On-Site Transfers*

Date		Inspected By	
Driver		Load Description	

☐ Loading pipe on trailer (Complete Part 2 first, Part 1 second)

☐ Unloading pipe from trailer (Complete Part 1 first, Part 2 second)

Part 1 - HDPE Pipe Load Checklist

No	Yes	N/A	
☐	☐		Load has not shifted and is not leaning
☐	☐		Trailer is equipped with stints, or pipe is loaded and strapped properly according to the HDPE Pipe Shipping Requirements
☐	☐	☐	Proper size dunnage (minimum 4x4) is in place between each layer of pipe with chocks on the ends (if applicable)

NOTE: If the HDPE pipe is not loaded properly or any of the above conditions have not been met (checked "No"), the truck will NOT be released for off-loading. The superintendent for the area receiving the pipe must be contacted immediately for further evaluation.

Load Approved	

Part 2 - Loading/Unloading Checklist

No	Yes	
☐	☐	All operators and safety watches have been task trained
☐	☐	Operator has completed a pre-use inspection card for equipment
☐	☐	Load area is free of other equipment, debris, rocks, holes, etc.
☐	☐	Clear access is established to both sides of the truck
☐	☐	Truck is sitting with wheels level and is chocked
☐	☐	A 50-ft safe zone has been established (or a substantial barrier is put in place)
☐	☐	Safety watch is in place
☐	☐	Driver is with the safety watch
☐	☐	Area where pipe will be placed is inspected

NOTE: Do NOT proceed with loading/unloading if any question above is answered "No"

Signatures Approving Loading/Unloading

Driver		*Safety Watch*		*Unloading Crew*	

Appendix E – HDPE Pipe Handling Rigging Approval Request

FREEPORT-McMoRan	Appendix E - HDPE Pipe Handling Rigging Approval Request

Attach all supporting documentation including but not limited to drawings, PE stamps, calculations, etc. For fabricated rigging a detailed drawing and PE stamp must be provided.

Date:	Site:	Division Manager:
Description of rigging:		Working load limit:

Engineering Review:

Engineering Review Summary

Pipe size and SDR:	Pipe length (ft):	Pipe yield strength:
When using a shackle to pipe assembly analysis must include the following:		
Shackle's working load limit (tons):	Shackles attached to pipe (number):	Shackle Pin Diameter *Dp* (inches):
Bushing diameter *Dp* (inches):	Hole Diameter in HDPE Pipe, *Dh* (inches):	Shackle Gap Opening Width, *W* (inches):
Opening Length, *L* (inches):	Edge of Pipe to Center of Hole, *R* (inches):	

Assembly Description/Diagram:

Parts List:

Include all parts such as: pulling head, swivel, nylon sling, shackle to equipment, master link, wire rope slings, flange break strength, rotational energy controls, etc.

Ref. #	*Quantity*	*Item Description*	*Supplier*	*Part Number*	*Working Load Limit*

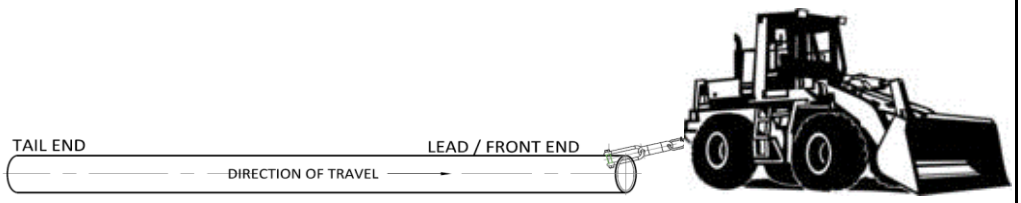
Name and Signatures (required for single use approval):
Engineer Conducting Review:
PSST Site Representative:
Division Manager:
Health and Safety Specialist:
Name and Signatures (required for inclusion):
Corporate PSST lead:
When completed, give a copy of all related documentation to the division record keeper for filing purposes.

Appendix F – HDPE Pipe Handling Illustrations

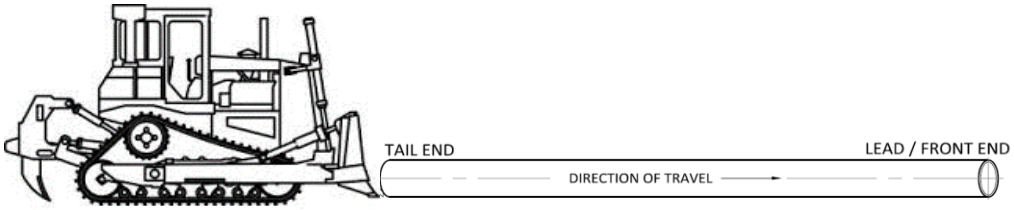
FREEPORT-McMoRan	Appendix F - Pipe Handling Illustrations

HDPE Pipe Handling Illustrations

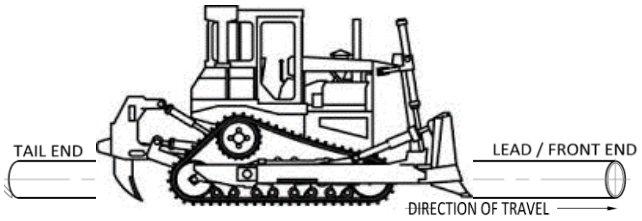
PULLING HDPE PIPE



PUSHING HDPE PIPE



PUSHING HDPE PIPE



POSITIONING HDPE PIPE