3R-443

Corrective Action Work Plan

Date: 8/26/13



August 26, 2013

ENTERPRISE PRODUCTS PARTNERS L.P. ENTERPRISE PRODUCTS HOLDINGS LLC (General Partner) ENTERPRISE PRODUCTS OPERATING LLC

Return Receipt Requested 7012 1010 0003 7361 4635

Mr. Steve Austin Navajo Nation Environmental Protection Agency P.O. Box 1999 Shiprock, New Mexico 87420

RCVD AUG 30 '13 OIL CONS, DIV. DIST, 3

Re: Corrective Action Workplan Gallegos Well Tie Line #90898, Gallegos #2 May 2012 Pipeline Release SE ¼ NE ¼, Sec 29, T26N, R11W San Juan County, New Mexico

Dear Mr. Austin:

Enterprise Field Services, LLC (Enterprise) is submitting the enclosed Corrective Action Workplan dated August 8, 2013, for petroleum hydrocarbon impacted soils remediation at the Gallegos Well Tie Line #90898, Gallegos #2 May 2012 pipeline release location.

Animas Environmental Services, LLC (AES) completed an initial release assessment documented in the *Site Investigation Work Plan for the Gallegos Well Tie Line #90898, Gallegos #2* dated June 22, 2012, and a site investigation detailed in the reported entitled *Gallegos Well Tie Line #90898, Gallegos #2 Pipeline Release Site Investigation Report* dated September 18, 2012. Based on laboratory analytical results from the investigation, groundwater was impacted above Water Quality Control Commission (WQCC) Groundwater Quality Standards near the southern bank of the Gallegos Wash.

In accordance with the *Groundwater Treatment and Confirmation Sampling Work Plan* dated September 19, 2012, a bio-remedial solution was injected at the site on September 20, 2012. On April 17, 2013, AES installed four temporary wells and collected groundwater samples to assess the effectiveness of the bio-remedial application. Laboratory analytical results indicated groundwater continued to be impacted above WQCC Standards. Details of the bio-remedial application and groundwater sampling are included in the enclosed workplan.

AES recommends excavation and removal of residual petroleum hydrocarbon impacted soil and groundwater at the location as detailed in the enclosed workplan. If you have any questions concerning the enclosed workplan, please do not hesitate to contact me at (713) 381-2286, or via email at: <u>drsmith@eprod.com</u>.

Sincerely,

David R. Smith, P.G. Sr. Environmental Scientist

Rodney M. Sartor, REM Sr. Manager, Environmental

/dep

Enclosure - Corrective Action Workplan Gallegos Well Tie Line #90898, Gallegos #2 May 2012 Pipeline Release

cc: Jim Griswold, New Mexico Oil Conservation Division, Santa Fe, NM Brandon Powell, New Mexico Oil Conservation Division, Aztec, NM

ec: Ross Kennemer - Animas Environmental Services, LLC, Farmington, NM

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District Copy



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Corrective Action Workplan Enterprise Field Services, LLC Gallegos Well Tie Line #90898, Gallegos #2 May 2012 Pipeline Release SE¼ NE¼ Section 29, T26N, R11W San Juan County, New Mexico

August 8, 2013

Prepared on behalf of: Enterprise Field Services, LLC 614 Reilly Avenue Farmington, NM 87401

Prepared by: Animas Environmental Services, LLC 624 E. Comanche Farmington, New Mexico 87401

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1.0 Introduction

Animas Environmental Services, LLC (AES), on behalf of Enterprise Field Services, LLC (Enterprise), has prepared a workplan to remediate petroleum hydrocarbon impacted soils at the Gallegos Well Tie Line #90898, Gallegos #2 May 2012 pipeline release location. The release was the result of two corrosion holes approximately 54 feet apart. Repair activities were completed on June 8, 2012. On July 6 through 11, 2012, AES completed a site investigation in order to delineate the full extent of petroleum hydrocarbon impact on soil and groundwater resulting from the release, and mitigation activities were suspended on June 12, 2012, due to difficulties with heavy equipment in the wet, sandy soils at the release site. Details of the initial release assessment were submitted in the *Site Investigation Work Plan for the Gallegos Well Tie Line #90898, Gallegos #2* dated June 22, 2012, and details of the site investigation were documented in the AES report entitled *Gallegos Well Tie Line #90898, Gallegos #2* dated September 18, 2012.

1.1 Site Location and NMOCD Ranking

The release areas are within the boundaries of the Navajo Nation within the SE¼ NE¼, Section 29, T26N, R11W, San Juan County, New Mexico. Latitude and longitude of Release #1 were recorded as N36.45979 and W108.02202, respectively. Latitude and longitude of Release #2 were recorded as N36.45988 and W108.02188, respectively. A topographic site location map is included as Figure 1, and an aerial map showing the release location is included as Figure 2.

In accordance with Navajo Nation Environmental Protection Agency (NNEPA) release protocols, action levels were established per NMOCD *Guidelines for Remediation of Leaks, Spills, and Releases* (August 1993) prior to the initial assessment. The release was given a ranking score of 40 based on the following factors:

- Depth to Groundwater: Known depth to groundwater is approximately 2.5 feet below ground surface (bgs). (20 points)
- Wellhead Protection Area: The release locations are not within a wellhead protection area. (0 points)
- Distance to Surface Water Body: The releases are located within an ephemeral drainage known as Gallegos Wash, which discharges into the San Juan River approximately 16.5 miles north of the release locations. In addition to Gallegos Wash, two ponds were identified approximately 220 feet and 500 feet upgradient of the release locations. (20 points)

2.0 Previous Site Activities

2.1 Release Assessment and Mitigation – May and June 2012

On May 28, 2012, the releases were discovered by Enterprise personnel, and employees were dispatched to confirm the releases and to shut in the affected well, de-pressurize the associated lines, and lock out/tag out associated control valves. The assessment of the pipeline was continued on June 6, 2012, when it was determined that the releases were a result of two corrosion holes (approximately 54 feet apart) in the pipeline. Enterprise contractors completed the repair of the pipeline on June 8, 2012.

On June 11 and 12, 2012, an Enterprise contractor excavated petroleum hydrocarbon impacted soil within the two release areas. The excavation was terminated on June 12, 2012, due to difficulties with heavy equipment ingress and egress in the wet, sandy soils. The final excavation dimensions measured approximately 98 feet by 14 feet by 2.5 feet deep. Prior to the excavation being backfilled, AES field screened soil samples for volatile organic compounds (VOCs) and collected confirmation soil samples from the excavation side walls for laboratory analysis. An additional sample was collected from a test hole that was excavated to 2 feet bgs immediately adjacent to the northwest wall of the excavation in order to delineate the extent of the release.

All soil samples had reported concentrations of benzene and total benzene, toluene, ethylbenzene, and xylenes (BTEX) below the applicable NNEPA action levels. However, concentrations of total petroleum hydrocarbons (TPH) were reported above the NNEPA action level of 100 mg/kg in two of the soil samples. The highest TPH concentration, as gasoline and diesel range organics, was reported in SC-5 with 291 mg/kg.

Groundwater was encountered within the excavation at approximately 2.5 feet bgs. On June 12, 2012, AES collected three confirmation groundwater samples in order to determine if groundwater had been impacted. Laboratory analytical results for TH-1W showed that dissolved phase concentrations were above NNEPA action levels for benzene (2,100 μ g/L), toluene (8,400 μ g/L), and xylenes (9,900 μ g/L). Note that for oil and gas releases, NNEPA utilizes New Mexico Water Quality Control Commission (WQCC) groundwater standards. Details of the initial site assessment were submitted in the *Site Investigation Work Plan for the Gallegos Well Tie Line #90898, Gallegos #2*, dated June 22, 2012.

Based on field screening and laboratory analytical results, AES recommended a continued site investigation in order to delineate the hydrocarbon impacted soil and groundwater.

2.2 Site Investigation – July 2012

On July 6 through 11, 2012, AES completed a site investigation in order to delineate the full extent of petroleum hydrocarbon impact on soil and groundwater resulting from the releases. The investigation included the installation of 13 temporary wells (TW-1 through TW-13) using a HydroPunch sampling tool and the collection of soil and groundwater samples.

A total of 13 soil samples were collected using a hand auger while installing soil borings to just above the capillary fringe. Soil field screening readings for VOCs and laboratory analytical results for benzene, total BTEX, and TPH showed reported concentrations below laboratory detection limits and NNEPA action levels in each soil boring.

Groundwater samples were collected from six of the temporary wells (TW-1, TW-2, TW-3, TW-5, TW-8, and TW-10) with a peristaltic pump. The remaining wells were not sampled because of insufficient water available for sample collection. Laboratory results confirmed groundwater impact in TW-3 with dissolved phase concentrations above WQCC standards for benzene (220 μ g/L), toluene (770 μ g/L), and xylene (1,400 μ g/L). All other samples were below laboratory detection limits or WQCC standards.

Additionally, dissolved phase gasoline range organic (GRO) concentrations were reported in TW-3 with 6.0 mg/L and in TW-5 with 0.053 mg/L, and diesel range organic (DRO) concentrations were reported in TW-3 with 7.0 mg/L and in TW-8 with 1.1 mg/L. All other samples were below laboratory detection limits for TPH (as GRO/DRO). Note that WQCC standards have not been established for TPH (as GRO/DRO).

Details of the groundwater investigation were included in the report entitled *Site Investigation Report for Enterprise Products Company Gallegos Well Tie Line #90898, Gallegos #2 Pipeline Release* dated September 18, 2012.

Based on laboratory analytical results from the July 2012 investigation, groundwater was impacted above WQCC standards near the southern bank of the Gallegos Wash. Therefore, AES recommended injection of a microbial bioremediation solution within the dissolved phase plume in Gallegos Wash with follow up groundwater sampling after the winter thaw.

2.3 Microbial Solution Application

On September 20, 2012, Alpha Bioscience Company of Farmington, New Mexico, applied 695 gallons of bio-remedial solution manufactured by Micro-TES, Inc., in accordance with the *Groundwater Treatment and Confirmation Sampling Work Plan* dated September 19, 2012. A grid microbial injection pattern was laid out over approximately 800 square feet, and approximately 550 gallons of the bio-remedial solution was injected into 150 injection points

spaced 2.5 to 3 feet apart. The solution was injected at 500 psi to 32 inches depth. The remaining 145 gallons of bio-remedial solution was then sprayed over the surface of the injection area.

2.4 Confirmation Groundwater Sampling

On April 17, 2013, Ross Kennemer and Lavina Lamone of AES installed four additional temporary wells (TW-14 through TW-17) by hand driving the HydroPunch screen with a fencepost driver, and screens were driven to depths ranging from approximately 5.7 to 6.9 feet bgs. The internal slotted screen of the HydroPunch was set across the top of the shallow groundwater table at depths ranging from 1.3 to 1.5 feet bgs and left in place to allow groundwater to infiltrate and reach equilibrium.

Groundwater samples were collected from each of the temporary wells with a 1 inch bailer. Following collection of each groundwater sample, depth to groundwater was measured with a water level indicator. Additionally, water quality parameters (pH, temperature, electrical conductivity, and oxygen reduction potential) were recorded for each temporary well, with the exception of TW-17. Note that depth to water and water quality parameters were not recorded for TW-17, because the boring caved in as the HydroPunch screen was being removed.

2.4.1 Field Measurements

Water quality measurements were recorded, and temperature readings ranged from 6.42°C in TW-16 to 9.65°C in TW-14. Conductivity readings were between 0.010 mS in TW-16 and 3.418 mS in TW-15, and pH ranged from 7.96 in TW-16 to 8.76 in TW-14. Dissolved oxygen ranged from 5.25 mg/L in TW-15 to 7.37 in TW-16. Water quality measurements are tabulated in Table 1.

2.4.2 Laboratory Analyses

The samples collected for laboratory analysis were placed into new, clean, laboratorysupplied containers, which were then labeled, placed on ice, and logged onto a sample chain of custody record. The samples were maintained on ice until delivery to the analytical laboratory, Hall, in Albuquerque, New Mexico. The groundwater samples were laboratory analyzed for:

BTEX per U.S. Environmental Protection Agency (USEPA) Method 8021B.

2.4.3 Laboratory Analytical Results

Laboratory analytical results for benzene, toluene, ethylbenzene, and xylenes were below laboratory detection limits in TW-10, TW-14, and TW-17. Dissolved phase benzene concentrations exceeded the WQCC standard of 10 μ g/L in TW-15 (4,400 μ g/L) and TW-16 (11 μ g/L). Dissolved phase toluene, ethylbenzene, and xylene also exceeded WQCC standards in TW-15 with reported concentrations of 22,000 μ g/L, 1,400 μ g/L, and 15,000 μ g/L, respectively. Laboratory analytical results are included in Table 2 and on Figure 3. Laboratory analytical reports are included in the Appendix.

3.0 Proposed Remediation Strategy

Based on the analytical results described in the previous section, groundwater continues to be impacted above WQCC standards near the southern bank of the Gallegos Wash. AES recommends excavation and removal of residual petroleum hydrocarbon impacted soil and groundwater at the location. The proposed scope of work is described in the following sections, and a general project layout of the proposed excavation extents is presented in Figure 4.

3.1 Pre-Field Permits and Coordination

3.1.1 Notification of Responsible Parties and Regulatory Agencies

Notification of the project schedule will be provided to Enterprise, NMOCD, and NNEPA at least seven days prior to beginning field activities.

3.1.2 Access Agreements

Prior to initiating the field work, Enterprise will coordinate with the Bureau of Indian Affairs (BIA), if required.

3.1.3 Archaeological/Cultural Resources

In the event that any evidence of artifacts and/or human remains are encountered, all work will be stopped immediately. The Navajo Nation Historic Preservation Department (NNHPD) will be contacted, and appropriate mitigation measures will be implemented.

3.1.4 U.S. Army Corps of Engineers Consultation

Prior to initiating backfilling of the excavation, Enterprise will determine if U.S. Army Corps of Engineers (USACE) consultation and/or permitting will be required.

3.1.5 Utilities Notification

AES will utilize the New Mexico One-Call (NMOC) system to identify and mark all underground utilities at the site before the start of any proposed field activities which could impact buried utilities. AES will also contact the Navajo Tribal Utility Authority (NTUA) which

does not participate in the NMOC system. Any known additional utilities not participating in the NMOC system will be contacted separately by the contractor for utility locations.

3.1.6 Health and Safety Plan

AES has a company health and safety plan in place, and all on-site personnel are 40-hour HAZWOPER trained in accordance with OSHA regulations outlined in 29 CFR 1910.120(e). Prior to the start of the excavation, AES will prepare a comprehensive site-specific Job Safety Analysis (JSA) addressing the site activities and associated soil and groundwater sampling. All employees and subcontractors are required to read and sign the JSA to acknowledge their understanding of the information contained within the JSA. The JSA will be implemented and enforced on site by the assigned Site Safety and Health Officer.

3.2 Excavation of Soil and Removal of Groundwater

AES proposes to excavate approximately 390 yd³ of petroleum hydrocarbon impacted soil from the south bank of the Gallegos Wash within the pipeline corridor. Foutz and Bursm Construction Company, Inc. will be retained for the field work. Prior to excavation, a small hydrovac unit will be used to expose the pipeline for confirmation of the pipeline location. A John Deer 240 trackhoe will be used to excavate the soil into 10 yd³ end dump trucks for transport. The dump trucks will have liners to prevent dripping from the wet sands during transport. Sets of equipment mats referred to as "swamp mats," comprised of four long wooden timbers, will be used beneath the excavator tracks to prevent the equipment from sinking into the wash sand. During excavation, two 80 barrel hydrovac trucks will be utilized to remove impacted groundwater from the excavation. Impacted soil and groundwater will be transported to the Envirotech Landfarm for proper disposal. Clean fill will be transported to the site on the return trip from the landfarm. Estimated excavation extents are shown on Figure 4.

3.2.1 Field Screening

During excavation activities, the sidewalls and base of the excavation will also be field screened for VOCs (PID-OVM) and TPH. Field TPH samples will be analyzed per USEPA Method 418.1 using a Buck Scientific Model HC-404 Total Hydrocarbon Analyzer Infrared Spectrometer. Once the sidewalls and base of the excavation are at or below 100 ppm VOCs and 100 mg/kg TPH, samples will be collected from each sidewall and base for confirmation laboratory analysis. Before beginning field screening, all field screening equipment will be appropriately calibrated according to industry standards, manufacturers recommendations, and AES standard operating procedures (SOPs).

3.2.2 Confirmation Soil Sampling

Confirmation soil sampling will be conducted prior to backfilling. Confirmation samples will be submitted to Hall Environmental Analysis Laboratory (Hall), Albuquerque, New Mexico, for analysis of BTEX per USEPA Method 8021B and TPH per USEPA Method 8015D. Samples

Enterprise Gallegos Well Tie Line #90898, Gallegos #2 May 2012 Pipeline Release Corrective Action Workplan August 8, 2013 Page 6

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will be analyzed on a rush turn-around time. Following confirmation of laboratory analytical results below applicable standards, the excavation will be backfilled with clean fill.

3.3 Proposed Confirmation Groundwater Sampling

In order to assess the effectiveness of the remediation efforts, AES proposes to install five temporary groundwater sampling points (TW-18 through TW-22) approximately six months after the excavation activities. The temporary sampling points will be installed in the vicinity of excavation extents and will be removed following sample collection. The proposed locations of the temporary wells, along with a construction schematic of a temporary well, are shown on Figure 4.

3.3.1 Notifications and Access Agreement

NNEPA and NMOCD require notification prior to the installation of temporary groundwater sampling points. Approval from the Bureau of Indian Affairs (BIA) will be required in the event that the confirmation sampling extends beyond the Enterprise pipeline right-of-way (ROW). The sampling is non-invasive, no vehicles will enter Gallegos Wash, and no "filling" will occur as part of the investigation. Therefore, U.S. Army Corps of Engineers (USACE) consultation and/or permitting is not anticipated.

3.3.2 Utilities Notification

AES will utilize the New Mexico One-Call system to identify and mark all underground utilities at the site before initiating the confirmation HydroPunch sampling. AES will also contact the NTUA separately for utility locates.

3.3.3 Health and Safety Plan

Prior to the start of the field work, AES will prepare and implement a comprehensive sitespecific Job Safety Analysis (JSA) addressing the investigation activities and associated groundwater sampling. All employees and subcontractors will be required to read and sign the JSA to acknowledge their understanding of the information contained within the JSA. The JSA will be implemented and enforced on site by the Site Safety and Health Officer.

3.3.4 Temporary Well Installation

In order to complete the confirmation sampling in a non-invasive manner, TW-18 through TW-22 will be "temporary" and installed by hand. If the results of the confirmation sampling warrant the installation of permanent monitoring wells, a separate workplan will be submitted at that time.

Temporary wells TW-18 through TW-22 will be installed utilizing a hand-driven HydroPunch sampling tool, which allows for in-situ collection of groundwater samples (see Figure 4 for schematic). At least four HydroPunch temporary wells will be installed within the vicinity of the excavation. Following installation, three well volumes will be purged from each temporary well and then allowed to stabilize for a minimum of one hour prior to sample

collection. Groundwater purged from the wells will be contained in labeled and sealed 55gallon drums. Purged water will be transported back to the AES yard and kept in a secure location until proper disposal. Following sample collection, each well will be fully removed and the well void allowed to collapse.

3.3.5 Groundwater Sample Collection

Groundwater is expected to be encountered within 3 to 4 feet of the ground surface. A peristaltic pump, with new tubing for each sampling point, will be used to collect the groundwater samples. Prior to collection of each sample, depth to groundwater will be measured with a water level indicator. Purging data, including pH, temperature, conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO), will be measured with a YSI water quality meter and documented on a Water Sample Collection Form along with purged water volume and sample depth.

Groundwater samples will be collected from each well with a new disposable bailer equipped with a low-flow release valve. All sampling equipment will be thoroughly decontaminated between uses. Purged water will be contained in a labeled and sealed 55gallon drum and transported to the Envirotech Landfarm for proper disposal.

3.3.6 Laboratory Analysis

All groundwater analytical samples will be submitted for laboratory analysis of the following parameters:

BTEX per USEPA Method 8021B or 8260B;

Once collected, all samples will be preserved in laboratory-supplied containers and stored in an insulated cooler containing ice. Samples will be shipped via bus to Hall in Albuquerque, New Mexico, in insulated coolers containing ice at less than 6°C.

4.0 Deliverables

AES will submit two letter reports, one after the completion of the excavation activities and one detailing groundwater sampling results (six months after completion of the excavation).

4.1 Excavation Report

The excavation report will detail excavation and backfill activities and include:

- Required permits and any access agreements;
- Detailed maps showing excavation area;
- Field screening and laboratory analytical results and reports;

- Waste manifests for soil and water that is transported and disposed of at an approved facility;
- Updated site maps;
- Site photographs.

4.2 Groundwater Sampling Report

Once the groundwater sampling results are received, a detailed report will be prepared and will include:

- HydroPunch temporary well installation and groundwater sampling activities performed;
- Tabulated groundwater quality measurements and laboratory analytical results;
- Photographic documentation;
- Scaled site maps showing temporary well locations and contaminant concentration results and contours;
- Conclusions and recommendations.

5.0 Implementation Schedule

AES proposes the following timeline to implement the corrective action. Note, this schedule assumes that no inclement weather occurs, which could result in a delay in implementing the field work. The schedule is also dependent on contractor availability.

Task	Days/Months from Workplan Concurrence or Approval		
Pre-field coordination, applicable permitting, work scheduling and notifications for excavation	1 week		
Utilities clearances	1 week		
Mobilization of equipment to/from location and excavation field work	2 weeks		
Receipt of laboratory analytical reports	3 weeks		
Prepare and submit excavation letter report	1 month		
Allow six months for groundwater contaminant concentration stabilization	6 months		
Complete confirmation groundwater sampling	7 months		
Prepare and submit groundwater sampling report	8 months		

Respectfully submitted,

Aleather M. Woods

Heather M. Woods, P.G. Project Manager

Invener M

Ross Kennemer Senior Project Manager

Elizabeth V Merdly

Elizabeth McNally, P.E. Principal

6.0 References

- Animas Environmental Services, LLC (AES). Site Investigation Work Plan for the Gallegos Well Tie Line #90898, Gallegos #2, June 22, 2012.
- AES. Gallegos Well Tie Line #90898, Gallegos #2 Pipeline Release Site Investigation Report, September 18, 2012.
- New Mexico Oil Conservation Division. 1993. Environmental Handbook: Miscellaneous Guidelines: Guidelines for Remediation of Spills, Leaks, and Releases. August 13, 1993. <u>http://www.emnrd.state.nm.us/ocd/EnvironmentalHandbook.htm</u>





GALLEGOS WELL TIE LINE #90898-

					/
	• 1w-9		• TW-7	e e e	
• TW-12		● TW-6	• TW-13	P P P P TW-2	
	● TW-8		• TW-1	RELEASE LOCATION #2 (N36.45988,W108.02188)	
		@ TW-16		• TW-4	
@ TW-17		/	RELEASE LOCA (N36.45979,W)	TION #1 108.02202)	AN
		P P		• TW-10	
	TW-15 @		@ TW-14		
	e e	TW-3	● TW-5		
	e / e				
10					

• TW-11

Sample ID	Date	Benzene (µg/L)	Toluene (μg/L)	Ethyl- benzene (µg/L)	Xylenes (µg/L)	TPH- GRO (mg/L)	TPH- DRO (mg/L)
WQCC STA	NDARD	10	750	750	620	NE	NE
TW-1	7/6/12	<2.0	2.2	<2.0	<4.0	<0.10	<1.0
TW-2	7/6/12	<2.0	4.2	<2.0	<4.0	<0.10	<1.0
TW-3	7/6/12	220	770	75	1,400	6.0	7.0
TW-5	7/6/12	2.2	7.6	<1.0	4.8	0.053	<1.0
TW-8	7/9/12	3.7	4.1	<2.0	<4.0	<0.10	1.1
TW-10	7/9/12	<2.0	<2.0	<2.0	<4.0	<0.10	<1.5
TW-14	4/17/13	<10	<10	<10	<20	NA	NA
TW-15	4/17/13	4,400	22,000	1,400	15,000	NA	NA
TW-16	4/17/13	11	23	37	180	NA	NA
TW-17	4/17/13	<10	<10	<10	<20	NA	NA

GALLEGOS WASH





(1 INCH = 20 FEET)





(1 INCH = 20 FEET)

3 FT STEEL BLANK CASING

_3 FT HYDROPUNCH SCREEN

NOT TO SCALE