GW - 32

PERMITS, RENEWALS, & MODS

2003 → 1997

Price, Wayne

From: Price, Wayne
Sent: Wednesday, December 10, 2003 3:27 PM
To: Dorinda Manncina (E-mail)
Subject: Ciniza GW-032 Draft Permit

Dear Dirinda:

Please find enclosed a very rough draft of the DP. Please provide comments if you wish.


Ciniza 01 DPAPP Draft.DOC

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Monday, December 08, 2003 3:53 PM
To: Wrotenbery, Lori; Anderson, Roger; Chavez, Frank
Cc: Olson, William; Foust, Denny
Subject: Giant Ciniza

Dear Team:

Dorinda Mancini, Giant's environmental representative, has requested OCD review the follow issue.

The issue of Pilot's truck stop (the old Giant truck stop) disposing of untreated commercial and sewage waste into the ponds of the refinery. This untreated waste goes into the refinery aeration lagoons where it goes through the same type of treatment for refinery wastewater. This type of treatment is primarily designed to remove or reduce benzene to non-hazardous levels. As pointed out by Giant, it does not do a very good job on certain types of bacteria. Also, in the past on occasions, if the truck stop had sewer problems, they would open a by-pass valve and this material would by-pass the refinery treatment system and go directly into the evaporation ponds.

Additional information has come to light regarding this matter. It has been discovered that there is a wide variety of possible dangerous substances coming from the Pilot convenience center. Dorinda, has told me that she has discovered hypodermic needles, raw sewage waste, ie floaters, paper, etc. All of the Giant employees have been forced to take hepatitis shots because of this situation. This is the same water that is currently being sold by Giant for "beneficial" use, such as road construction, and dust control. This water has been shown to contain e-coli and fecal coliform bacteria. According to Giant, they need to sell this water in order to keep the ponds at safe levels or reduce refinery capacity.

Dorinda and the rest of the Giant employees, including those at the corporate level, are adamantly opposed to the continuance of this practice, since they can't really control Pilot's operations anymore. While this practice has been permitted in the past, Giant would like to take this opportunity (renewal of the discharge permit) to change this. They would like to be able to rely on us (OCD) to allow them to discontinue acceptance of this waste or require Pilot to install a water treatment system.

I see the following issues:

1. OCD does not have regulatory authority over Pilot.
2. The water being placed in the ponds or sold for beneficial use *may* be a health hazard to the public or wildlife.
3. Giant indicates they cannot afford to treat the water and needs to continue the sale of the water.
4. The sale of the truck stop was contingent upon Giant continuing taking the water.
5. OCD has allowed this in the past when Giant owned the truck stop.

I need your help on this complex issue. Please let me know when we can meet about this, OCD approval of the discharge permit is pending this discussion.

Thank you.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Monday, October 06, 2003 10:23 AM
To: 'Dorinda Mancini'; Price, Wayne; 'david_cobrain@nmenv.state.nm.us'
Subject: RE: NEW WELL PROJECT

Approved by OCD October 06, 2003.

-----Original Message-----
From: Dorinda Mancini [mailto:dmancini@giant.com]
Sent: Monday, October 06, 2003 10:20 AM
To: 'WPrice@state.nm.us'; 'david_cobrain@nmenv.state.nm.us'
Subject: NEW WELL PROJECT
Importance: High

<<Well Concurrence letter October 2003.doc>>

I will fax a copy on letterhead and with a signature for the record. Dorinda Mancini

Price, Wayne

From: Price, Wayne
Sent: Monday, July 28, 2003 11:42 AM
To: 'dmancini@giant.com'
Cc: Tom Atwood (E-mail)
Subject: Giant Cineza Discharge Plan

Contacts: Dorinda Manncina

The new Deadline for the Discharge plan is September 10, 2003.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

Memorandum of Meeting or Conversation

Telephone ____
Personal ___XX___
E-Mail _____

Time: **10am-4pm**
Date: July 23, 2003

Originating Party: **OCD/NMED**

Other Parties: **Giant personnel**

Subject: **Monitoring points for DP renewal**
Discussion: **Discussed with Giant a plan to be incorporated into the DP renewal to include all monitoring points for both OCD and NMED and discussed plugging of certain wells.**

Conclusions or Agreements:
Giant's consultant will summarize monitoring points and submit in DP application.

Signed:___

CC:

Giant
Cinizq Refinery
July 23, 2003

Denny Foust	NMOCD	505-334-6178 ext 15	dfoust@state.nm.us
Bill Kingsley	Precision Engineering	505-523-7674	werpei@aol.com
Bill Olson	NMOCD	505-476-3491	wolson@state.nm.us
Dave Cobrain	NMED-HWB	505-428-2553	david-cobrain@nmenv.state.nm.us
Wayne Price	OCD-S.F.	505-476-3487	wprice@state.nm.us
Dorinda Mancini	GRC-Cinza	505-722-0227	dmancini@giantgrant.com
Ed Riege	Giant	505-722-0217	eriege@giant.com
Tom Atwood	PES	303-759-5137	tomatwood@Aol.com

Price, Wayne

From: Price, Wayne
Sent: Monday, April 21, 2003 3:26 PM
To: 'Dorinda Mancini'; 'david_cobrain@nmenv.state.nm.us'; Price, Wayne
Cc: Ed Riege; Steve Morris; Tom Atwood (E-mail); Matt Davis
Subject: RE: cinizaboundrywells

Dear Dorinda:

I have reviewed the attached Well Placement Plans and have the following questions:

1. If groundwater is encountered and monitor wells are completed, will any of the screen be above the water level?

2. If a sand zone (wet or dry permeable layer) is found directly below the ponds and a confining layer is below this, will you complete these as monitoring points? OCD has a concern that if the ponds are leaking into this shallow zone then it could be leaving your property without monitoring.

-----Original Message-----
From: Dorinda Mancini [mailto:dmancini@giant.com]
Sent: Wednesday, April 16, 2003 1:30 PM
To: 'david_cobrain@nmenv.state.nm.us'; 'WPrice@state.nm.us'
Cc: Ed Riege; Steve Morris; Tom Atwood (E-mail); Dorinda Mancini; Matt Davis
Subject: cinizaboundrywells
Importance: High

<<Well Approval letter April 2003.doc>> <<cinizaboundrywells.doc>>

Dear Wayne and Dave - Here are the Project Scope/Costs and our letter requesting your concurrence/approval.

I will send them via post office also, so you will have copies w/signatures for your files.

I will be out of the office from 4/18-4/27. If you have questions during that time, please call Steve Morris @ 505.722.0258. I will be keeping in touch with him.

Dorinda

GIANT
REFINING COMPANY

April 16, 2003

Wayne Price
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Dave Cobrain
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505

RE: Well Placement Approval

Dear Mr. Price and Mr. Cobrain:

Over the past several years, your offices and Giant discussed replacement and addition of wells along the property boundaries in the Northwest corner of the Ciniza Refinery. We submitted a map and description of the proposed wells in our monthly progress reports of 2003. We also included a request for closure of Wells OW-2 and OW-3. The new wells will provide better information about groundwater quality in the area currently monitored by OW-2 and OW–3.

As we understand it, the purpose of these new wells is to ensure that no contamination of groundwater has occurred and to provide a means to monitor the groundwater on a regular schedule (annually) to ensure that any potential future contamination is discovered.

Included with this request for approval and concurrence of the placement of the wells, is the estimated costs (supplied by Precision Engineering, Inc.) for drilling of up to nine wells in three locations and the closure of OW-2 and OW-3 (~$66,000). We estimate analytical costs at about $3000/well for the initial sampling, for a total project cost of ~$100,000.

Because this is a very significant project with substantial costs, Giant requests your concurrence for the location and purpose of the new wells and the closure of OW-2 and OW-3. Once we receive your approval, Ciniza will prepare an internal Request for Expenditure for these funds.

We plan to start drilling in early June, 2003. Your prompt attention and written response is needed to secure the funds in time to meet our proposed start date.

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

Please contact me at 505.722.0227 or @ ***dmancini@giant.com*** with any questions or concerns regarding this request. Thank you for your assistance.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

Enc

CC: Roger Anderson, OCD
Dave Cobrain, HWB
Ed Riege, Env. Superintendent
Matthew Davis, General Manager (w/o enc.)
File

PRECISION ENGINEERING, INC.
P.O. BOX 422 • LAS CRUCES, NM 88004
PH: (505) 523-7674
FAX 505-523-7248 • e-mail: werpei@aol.com

April 8, 2003

Ms. Dorinda Mancini
Giant Refining Company, Inc.
Ciniza Refinery
Route 3, Box 7
Gallup, New Mexico 87301

Re: Proposal for Refinery Boundary Wells
Ciniza Refinery Facility Site

Dorinda,

This letter is our proposal for installation of monitoring wells at the perimeter of the refinery property. Briefly summarized we understand the scope of services will be to install up to three (3) wells at each of three (3) locations (up to nine (9) wells total). Additionally, two existing wells, OW-2 and OW-3, will be closed and permanently sealed. Below is a list and brief description of the tasks that will be performed to accomplish the required work to the satisfaction of the OCD, who we understand is requiring the work. Should you require, we will discuss our proposed scope with the OCD so that there is an understanding with all parties as to our perception of the project needs.

Task 1

Mobilize all materials and equipment to the site (Ciniza Refinery). Precision Engineering, Inc. will furnish all equipment, personnel, and materials to construct the wells and close out the existing wells. In the past, as a cost saving measure the Refinery has elected to furnish some materials (bagged cement, and concrete mix as examples). Should the Refinery wish to do this for the proposed project the final fee will be adjusted accordingly. Precision Engineering, Inc. will provide lodging and per diem for all its personnel assigned to the project.

Task 2

Meet with project related personnel and stake the well locations. The wells at the site are anticipated to be artesian. New Mexico State guidelines indicate that all wells that are artesian in nature are subject to the requirements of the Office of the State Engineer and as such will require permitting. Precision Engineering, Inc. will assist Giant Refining Company in obtaining the required permits to install the wells. Precision Engineering, Inc. will also notify all individuals as required by law as to the time of installation and will invite all OSE officials to be present during the installation. It is unlikely these regulatory officials will wish to be present, however, it is our responsibility to make the offer.

Task 3

One boring will be advanced at each of the three locations for the purpose of obtaining a detailed stratigraphic log of the site formation. The boring will be sampled continuously using a static split barreled intrusion sampler mounted ahead of the advancing auger. The samples will be logged in detail with special attention paid to the notation of free water locations. This log will be used to locate water bearing zones above the soil/Chinle Formation interface. Precision Engineering, Inc. will meet with project related personnel and decisions concerning the location of screens will be made. Historically, a gravelly or sandy horizon has been observed to directly overly the unweathered Chinle Formation. At many locations at the site this permeable zone is water bearing as a result of water accumulation on top of the impervious siltstones and claystones that form the bulk of the Chinle Shales. Assuming this zone is water bearing a monitoring well will be placed with screen crossing the entire thickness of this layer. If the zone is not water bearing a decision will be made with the concurrence of the Refinery Environmental Department representative and, if necessary, representatives of appropriate regulatory agencies. These wells will be described as "interface wells" and the gravel layer itself will be referred to as the "interface zone" when referred to in this document.

Where the log of the boring indicates there are sand zones above the interface layer that are water bearing an additional well will be placed that discretely monitors the water from that upper zone. Screen length may vary somewhat in these wells since thickness of the zone(s) being monitored are anticipated to vary. Again, prior to placing the screens concurrence from project related parties will be obtained. The wells located above the interface zone will be labeled as the "sand wells" and the monitored zones will be known as the "sand zones" where referred to later in this document.

In addition to the wells monitoring the recent alluvial and fluvial sediments above the Chinle Formation, an additional well will be advanced to the Sonsela Sandstone; a named sandstone bed within the Chinle Formation. It is anticipated that installation of these wells will require a change of drilling methods to rotary. Currently it is planned to use "foam" to drill the borings. The use of foam as a drilling agent will require little water and has no significant environmental impact of the surface or subsurface. The well will be placed to monitor the water that is migrating through the Sonsela Sandstone bed. The well designation in this document will be "Sonsela well".

All wells placed for this activity will be constructed using two (2) inch nominal diameter, schedule 40, PVC riser pipe. Screens will be constructed of machine slotted schedule 40, PVC. Slotted pipe will have openings of 0.010 inch (#10). All wells will have bottom end caps. The screen and casing will be equipped with centralizers that will keep the casing centered in the bore hole and vertical. Centralizers will be placed at a maximum of twenty foot intervals to keep the relatively small diameter casing from buckling. In the deep wells the casing will be suspended as well to prevent buckling.

The screen will be sand packed from a point one (1) foot below the bottom of the screen to a point two (2) feet above the top of the screen. The sand will be sized to limit the amount of fines that migrate laterally into the well. A standard 10-20 grading will be used. It should be noted that because of the limited amount of water available in some of the water bearing sands and their proximity to adjacent clays, development of the wells to clear water is considered unlikely.

A layer of montmorillonite clay (bentonite) pellets a minimum of two (2) feet in thickness will be placed immediately above the sand. It is anticipated that the wells will be somewhat artesian. As a result bentonite coated with "confectioner's lacquer" will be used to retard the reaction (hydration) with water until the pellets are at the desired location. The confectioner's lacquer is a food grade product and will not impact the water quality of the wells. Once the montmorillonite clay has hydrated, the wells will be grouted to the surface with slurry comprised of 6% montmorillonite clay (bentonite) and 94% Portland Type I-II cement.

Once the slurry has been allowed to set, an above ground vault will be constructed. The vault will be constructed of a six (6) inch steel casing mounted in a four (4) foot square pad. At locations where the vault is in danger of being hit by traffic, three (3) inch diameter steel bollards filled with concrete will be placed in the surface pad as well. The pad will be sloped away from the vault pipe to facilitate drainage away from the well annulus.

The primary steel vault that shields the PVC riser pipe will extend into the surface pad approximately twenty-four (24) inches. The steel protective vault will be capped with a lockable aluminum protective casting that indicates the vault contains a monitoring well. The exterior surface of the cap will be imprinted with the well designation. The interior of the cap will have the date the well was placed, total depth of the well, amount of screen and the contact where logs can be obtained. The PVC riser pipe will be equipped with a lockable expansion cap. Locks will not be provided, however, keyed alike locks can be provided if requested.

Drilling will be accomplished using the following unit or combination of drilling units:

CME 75D and CP-650

Task 4

The wells will be purged and developed. The primary purpose of the purge and development is to clean the sediment from the sanding effort. Developing the wells to produce clear water will not be part of the development process.

Task 5

After all work is complete at each of the three locations the site will be cleaned up and restored as close as practical to the predrilling condition. Cuttings will be leveled, or if they are contaminated they will be transported to a holding area as designated by Giant Refining Company Environmental Department representatives.

Task 6

After it is determined the wells that are installed in the above tasks are producing at a rate acceptable to Giant Refining Company, wells designated as OW-2 and OW-3 will be closed. Both wells report they have been finished with grouted in place PVC casing making pulling the casing impossible or impractical at best. It is proposed that the closure process be as follows:

1) Tremmie a fluidized portland cement grout from the bottom of the well to the top. Grout will be treated with fluidizing agents so that it will intrude into the formation and all gravel pack areas.

2) A heavy portland cement grout will then be pumped into the well and pressurized to fill all annular spaces. Since the casing has been grouted in place, casing splitting then grouting will not be required.

3) Grout volume will be monitored. A grout volume that is a minimum of one and three-fourths (1-¾) of the computed theoretical volume of the well will be injected.

4) The surface vaults will be removed and disposed of at a location on the facility property designated by Giant Refining Company.

5) Any exposed casing will be cut off below grade and the site will be cleaned up and leveled.

Task 7

Well collar (ground) elevations and top of casing elevations will be determined.

Task 8

Logs and notes taken during the installation of the wells and during the closure of OW-2 and OW-3 will be provided to Giant Refining Company. All well stratigraphy will be entered into the Giant Refining-Ciniza data base kept by Precision Engineering, Inc. Although subsurface models will not be updated as a part of this project the information will be available for incorporation into any future subsurface model updates required by the client.

End of Tasks

Because of the decisions that must be made on the site as well as the need for accurate and detailed logging, a registered professional geological engineer as well as a geologist will be present at the site at all times throughout the project. The engineer and geologist assigned to this project are:

William H. Kingsley, PE and Nathan A. Sanders

Additional technicians will be used on this project as required. If you require resumes of the above personnel please contact our office.

Because the presence or absence of water above the interface zone is not known at the facility boundary, a lump sum price is not practical. It is also not 100% certain that there will be water at the interface zone, although it is assumed that this will be a monitoring point. It is known that the Sonsela Sandstone is located at all points below the facility property. The following has been developed considering the variable nature of the upper sediments.

Mobilization:	**$4,750.00**
Drill and Log Continuous Boring (Three Locations lump sum):	**$6,930.00**
Install Interface Wells (per Each):	**$2,140.00**
Drill and Install Sand Wells (per Each):	**$2,870.00**
Drill and Install Sonsela Wells (Three Wells lump sum):	***$36,500.00**
Close Wells OW-2, OW-3 (lump sum):	**$1,700.00**

* - If 4" materials are used for these wells - **$37,310.00**

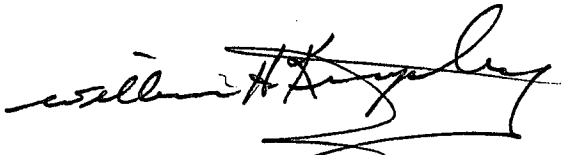
If the total possible scope of this project is performed there will be a total of three (3) sand wells, three (3) interface wells, and three (3) Sonsela wells. The nine (9) wells will be located on a total of three (3) sites on the Giant Refining-Ciniza Refinery Site. For the purpose of this proposal it

has been assumed that the sand wells will not exceed seventy (70) feet in depth, the interface wells will not exceed ninety (90) feet in depth, and the Sonsela wells will not exceed a total depth of one hundred sixty (160) feet. If all portions of the project are performed, and the 4" material option is selected for the Sonsela wells only, the fee will not exceed **$65,720.00**.

New Mexico Gross Receipts Tax at a rate of 6.5% ($4,271.80 max.) will be added to the final fee for this project.

We will schedule the project to fit your timelines upon receipt of notice to proceed. If you have questions concerning the intent of the proposal or require clarification concerning the proposed tasks, contact our office. We look forward to working with you on this project.

Sincerely,
Precision Engineering, Inc.



William H. Kingsley, PE

GIANT INDUSTRIES, INC.

CINIZA REFINERY

Date 4/16/03

Number of pages including cover sheet 8

TO: Wayne Price

Phone
Fax 505-476-3462

FROM: Dorinda Mancini
Environmental Manager
Ciniza Refinery, Giant Refining Co.
Route 3 Box 7
Gallup, N. M. 87301

Phone 505/722-0227
Fax 505/722-0210
E-mail dmancini@giant.com

CC:

REMARKS: ☐ Urgent ☒ For your review ☒ Reply ASAP ☐ Please Comment

Wayne -
Here is our request for approval of the mud project.
I also emailed it & will send hard cover.
Thanks.
Dorinda Mancini
Please feel free to call Bill Hargaley for any discussion.

GIANT
REFINING COMPANY

April 16, 2003

Wayne Price
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Dave Cobrain
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505

RE: Well Placement Approval

Dear Mr. Price and Mr. Cobrain:

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As we understand it, the purpose of these new wells is to ensure that no contamination of groundwater has occurred and to provide a means to monitor the groundwater on a regular schedule (annually) to ensure that any potential future contamination is discovered.

Included with this request for approval and concurrence of the placement of the wells, is the estimated costs (supplied by Precision Engineering, Inc.) for drilling of up to nine wells in three locations and the closure of OW-2 and OW-3 (~$66,000). We estimate analytical costs at about $3000/well for the initial sampling, for a total project cost of ~$100,000.

Because this is a very significant project with substantial costs, Giant requests your concurrence for the location and purpose of the new wells and the closure of OW-2 and OW-3. Once we receive your approval, Ciniza will prepare an internal Request for Expenditure for these funds.

We plan to start drilling in early June, 2003. Your prompt attention and written response is needed to secure the funds in time to meet our proposed start date.

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

Please contact me at 505.722.0227 or @ *dmancini@giant.com* with any questions or concerns regarding this request. Thank you for your assistance.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

Enc

CC: Roger Anderson, OCD
Dave Cobrain, HWB
Ed Riege, Env. Superintendent
Matthew Davis, General Manager (w/o enc.)
File

PRECISION ENGINEERING, INC.
P.O. BOX 422 • LAS CRUCES, NM 88004
PH: (505) 523-7674
FAX 505-523-7248 • e-mail: werpei@aol.com

April 8, 2003

Ms. Dorinda Mancini
Giant Refining Company, Inc.
Ciniza Refinery
Route 3, Box 7
Gallup, New Mexico 87301

Re: Proposal for Refinery Boundary Wells
Ciniza Refinery Facility Site

Dorinda,

This letter is our proposal for installation of monitoring wells at the perimeter of the refinery property. Briefly summarized we understand the scope of services will be to install up to three (3) wells at each of three (3) locations (up to nine (9) wells total). Additionally, two existing wells, OW-2 and OW-3, will be closed and permanently sealed. Below is a list and brief description of the tasks that will be performed to accomplish the required work to the satisfaction of the OCD, who we understand is requiring the work. Should you require, we will discuss our proposed scope with the OCD so that there is an understanding with all parties as to our perception of the project needs.

Task 1

Mobilize all materials and equipment to the site (Ciniza Refinery). Precision Engineering, Inc. will furnish all equipment, personnel, and materials to construct the wells and close out the existing wells. In the past, as a cost saving measure the Refinery has elected to furnish some materials (bagged cement, and concrete mix as examples). Should the Refinery wish to do this for the proposed project the final fee will be adjusted accordingly. Precision Engineering, Inc. will provide lodging and per diem for all its personnel assigned to the project.

Task 2

Meet with project related personnel and stake the well locations. The wells at the site are anticipated to be artesian. New Mexico State guidelines indicate that all wells that are artesian in nature are subject to the requirements of the Office of the State Engineer and as such will require permitting. Precision Engineering, Inc. will assist Giant Refining Company in obtaining the required permits to install the wells. Precision Engineering, Inc. will also notify all individuals as required by law as to the time of installation and will invite all OSE officials to be present during the installation. It is unlikely these regulatory officials will wish to be present, however, it is our responsibility to make the offer.

Task 3

One boring will be advanced at each of the three locations for the purpose of obtaining a detailed stratigraphic log of the site formation. The boring will be sampled continuously using a static split barreled intrusion sampler mounted ahead of the advancing auger. The samples will be logged in detail with special attention paid to the notation of free water locations. This log will be used to locate water bearing zones above the soil/Chinle Formation interface. Precision Engineering, Inc. will meet with project related personnel and decisions concerning the location of screens will be made. Historically, a gravelly or sandy horizon has been observed to directly overly the unweathered Chinle Formation. At many locations at the site this permeable zone is water bearing as a result of water accumulation on top of the impervious siltstones and claystones that form the bulk of the Chinle Shales. Assuming this zone is water bearing a monitoring well will be placed with screen crossing the entire thickness of this layer. If the zone is not water bearing a decision will be made with the concurrence of the Refinery Environmental Department representative and, if necessary, representatives of appropriate regulatory agencies. These wells will be described as "interface wells" and the gravel layer itself will be referred to as the "interface zone" when referred to in this document.

Where the log of the boring indicates there are sand zones above the interface layer that are water bearing an additional well will be placed that discretely monitors the water from that upper zone. Screen length may vary somewhat in these wells since thickness of the zone(s) being monitored are anticipated to vary. Again, prior to placing the screens concurrence from project related parties will be obtained. The wells located above the interface zone will be labeled as the "sand wells" and the monitored zones will be known as the "sand zones" where referred to later in this document.

In addition to the wells monitoring the recent alluvial and fluvial sediments above the Chinle Formation, an additional well will be advanced to the Sonsela Sandstone; a named sandstone bed within the Chinle Formation. It is anticipated that installation of these wells will require a change of drilling methods to rotary. Currently it is planned to use "foam" to drill the borings. The use of foam as a drilling agent will require little water and has no significant environmental impact of the surface or subsurface. The well will be placed to monitor the water that is migrating through the Sonsela Sandstone bed. The well designation in this document will be "Sonsela well".

All wells placed for this activity will be constructed using two (2) inch nominal diameter, schedule 40, PVC riser pipe. Screens will be constructed of machine slotted schedule 40, PVC. Slotted pipe will have openings of 0.010 inch (#10). All wells will have bottom end caps. The screen and casing will be equipped with centralizers that will keep the casing centered in the bore hole and vertical. Centralizers will be placed at a maximum of twenty foot intervals to keep the relatively small diameter casing from buckling. In the deep wells the casing will be suspended as well to prevent buckling.

The screen will be sand packed from a point one (1) foot below the bottom of the screen to a point two (2) feet above the top of the screen. The sand will be sized to limit the amount of fines that migrate laterally into the well. A standard 10-20 grading will be used. It should be noted that because of the limited amount of water available in some of the water bearing sands and their proximity to adjacent clays, development of the wells to clear water is considered unlikely.

A layer of montmorillonite clay (bentonite) pellets a minimum of two (2) feet in thickness will be placed immediately above the sand. It is anticipated that the wells will be somewhat artesian. As a result bentonite coated with "confectioner's lacquer" will be used to retard the reaction (hydration) with water until the pellets are at the desired location. The confectioner's lacquer is a food grade product and will not impact the water quality of the wells. Once the montmorillonite clay has hydrated, the wells will be grouted to the surface with slurry comprised of 6% montmorillonite clay (bentonite) and 94% Portland Type I-II cement.

Once the slurry has been allowed to set, an above ground vault will be constructed. The vault will be constructed of a six (6) inch steel casing mounted in a four (4) foot square pad. At locations where the vault is in danger of being hit by traffic, three (3) inch diameter steel bollards filled with concrete will be placed in the surface pad as well. The pad will be sloped away from the vault pipe to facilitate drainage away from the well annulus.

The primary steel vault that shields the PVC riser pipe will extend into the surface pad approximately twenty-four (24) inches. The steel protective vault will be capped with a lockable aluminum protective casting that indicates the vault contains a monitoring well. The exterior surface of the cap will be imprinted with the well designation. The interior of the cap will have the date the well was placed, total depth of the well, amount of screen and the contact where logs can be obtained. The PVC riser pipe will be equipped with a lockable expansion cap. Locks will not be provided, however, keyed alike locks can be provided if requested.

Drilling will be accomplished using the following unit or combination of drilling units:
CME 75D and CP-650

Task 4

The wells will be purged and developed. The primary purpose of the purge and development is to clean the sediment from the sanding effort. Developing the wells to produce clear water will not be part of the development process.

Task 5

After all work is complete at each of the three locations the site will be cleaned up and restored as close as practical to the predrilling condition. Cuttings will be leveled, or if they are contaminated they will be transported to a holding area as designated by Giant Refining Company Environmental Department representatives.

Task 6

After it is determined the wells that are installed in the above tasks are producing at a rate acceptable to Giant Refining Company, wells designated as OW-2 and OW-3 will be closed. Both wells report they have been finished with grouted in place PVC casing making pulling the casing impossible or impractical at best. It is proposed that the closure process be as follows:

1) Tremmie a fluidized portland cement grout from the bottom of the well to the top. Grout will be treated with fluidizing agents so that it will intrude into the formation and all gravel pack areas.

2) A heavy portland cement grout will then be pumped into the well and pressurized to fill all annular spaces. Since the casing has been grouted in place, casing splitting then grouting will not be required.

3) Grout volume will be monitored. A grout volume that is a minimum of one and three-fourths (1-¾) of the computed theoretical volume of the well will be injected.

4) The surface vaults will be removed and disposed of at a location on the facility property designated by Giant Refining Company.

5) Any exposed casing will be cut off below grade and the site will be cleaned up and leveled.

Task 7

Well collar (ground) elevations and top of casing elevations will be determined.

Task 8

Logs and notes taken during the installation of the wells and during the closure of OW-2 and OW-3 will be provided to Giant Refining Company. All well stratigraphy will be entered into the Giant Refining-Ciniza data base kept by Precision Engineering, Inc. Although subsurface models will not be updated as a part of this project the information will be available for incorporation into any future subsurface model updates required by the client.

End of Tasks

Because of the decisions that must be made on the site as well as the need for accurate and detailed logging, a registered professional geological engineer as well as a geologist will be present at the site at all times throughout the project. The engineer and geologist assigned to this project are:

William H. Kingsley, PE and Nathan A. Sanders

Additional technicians will be used on this project as required. If you require resumes of the above personnel please contact our office.

Because the presence or absence of water above the interface zone is not known at the facility boundary, a lump sum price is not practical. It is also not 100% certain that there will be water at the interface zone, although it is assumed that this will be a monitoring point. It is known that the Sonsela Sandstone is located at all points below the facility property. The following has been developed considering the variable nature of the upper sediments.

Mobilization:	**$4,750.00**
Drill and Log Continuous Boring (Three Locations lump sum):	**$6,930.00**
Install Interface Wells (per Each):	**$2,140.00**
Drill and Install Sand Wells (per Each):	**$2,870.00**
Drill and Install Sonsela Wells (Three Wells lump sum):	***$36,500.00**
Close Wells OW-2, OW-3 (lump sum):	**$1,700.00**

* - If 4" materials are used for these wells - **$37,310.00**

If the total possible scope of this project is performed there will be a total of three (3) sand wells, three (3) interface wells, and three (3) Sonsela wells. The nine (9) wells will be located on a total of three (3) sites on the Giant Refining-Ciniza Refinery Site. For the purpose of this proposal it

has been assumed that the sand wells will not exceed seventy (70) feet in depth, the interface wells will not exceed ninety (90) feet in depth, and the Sonsela wells will not exceed a total depth of one hundred sixty (160) feet. If all portions of the project are performed, and the 4" material option is selected for the Sonsela wells only, the fee will not exceed **$65,720.00**.

New Mexico Gross Receipts Tax at a rate of 6.5% ($4,271.80 max.) will be added to the final fee for this project.

We will schedule the project to fit your timelines upon receipt of notice to proceed. If you have questions concerning the intent of the proposal or require clarification concerning the proposed tasks, contact our office. We look forward to working with you on this project.

Sincerely,
Precision Engineering, Inc.

William H. Kingsley, PE

GIANT
REFINING COMPANY

PLAN
SEP 8

April 7, 2003

Wayne Price
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: February/March 2003 Progress Report
Giant Refining Co., Ciniza Refinery GW-032 Discharge Plan

Dear Mr. Price:

As your office has requested, Ciniza is submitting a progress report on the Discharge Plan renewal issues identified in our 12/10/02 meeting. The Draft Permit will be submitted to your office by June 15, 2003.

1. Three additional nested wells around ponds - We anticipate that the drilling will start the first week in June, 2003. We would like to confirm your approval of the proposed sites ASAP so that we can request the funds for this work. It is unlikely that Ciniza will receive the funds unless the state concurs in writing that our plan meets their approval. We will send a letters under separate cover asking for OCD and NMED concurrence. BY MAY 01, 2003 LETTER

2. Investigate tank farm area near recovery wells and install possible French drain – Enclosed are logs from the following borings: 656, 657, 658, 659, 665, and 668. These logs represent borings outside the tank farm dikes, to the north, east and northeast, of Tanks 337, 344, and 345. Please see item # 6 below for the area inside the dike.

3. Investigate around old OW-20 high pH area – Enclosed are the original boring log for OW-20 from January, 1981. On January 14 and 15, 2003, Precision Engineering attempted to drill two different replacement wells in the same area as the original OW-20. We were unsuccessful in replacing OW-20 and closed the well on January 15th. You will find the logs for the attempted replacement wells and the well closure report enclosed. For general information, I am enclosing the well closure procedure used by Precision Engineering.

4. Investigate past OW-29. Find possible channels – Enclosed you will find logs for the following borings near and around the area between the NE corner of the tank farm and the North boundary of the plant: b-1(B1), b-3(B3), 643, 648, 649, MP-4, and MP-9.

5. Inspect the truck center – **At your convenience.**

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

6. Find out where OW-17 was located. Now closed, but was originally located w/in tank farm. Sonsela wells were closed in this area. – Please see "close up" map of the area near OW-17 and other wells/borings in the area inside the berms of Tanks 337, 344, and 345. Logs enclosed include: 666, 667, RW-5 (recovery well), RW-6 (recovery well). Also enclosed are the original logs and well closure reports for wells: OW-16, OW-17, OW-25 and OW-26.

7. Prevent runoff from the old temporary pond area – **Complete**.

8. Show drainage ditches on drawings – **Will be included w/Discharge Plan Application due to your office by June 15, 2003.**

9. Submit storm water plan – see #8 above

10. Giant wants to monitor only OW-11, 12, 14, 29, 30 and MW 4 – **Groundwater results for all wells sampled in 2002 will be submitted to NMED, RCRA Programs and OCD on June 1, 2003 along with the Discharge Plan Application.**

11. Giant wants to close OW-2 and OW-3 and replace with new ones – see #1 above.

12. Giant does not want to monitor OW-1, OW-9, and OW-10. RCA wants these wells to be checked to make sure they are still under artesian conditions – No additional information.

13. NMED (RCRA) wants MW-1, 4, 5 and SMW-4 monitored (LTU) – **See # 10 above.**

14. RCA wants Pond #2 sampled – **We would like to confirm this before we submit the discharge plan. As we understand this item, the outlet at Pond #2 will be the compliance point for sampling for the wastewater treatment system / evaporation pond system interface. Parameters will be established by OCD as part of the new Discharge Plan. Ciniza would like to confirm this interpretation as soon as possible.**

15. Old API must be rebuilt or demonstrate that it is not leaking – The API Separator is scheduled for cleaning and inspection the week of April 28, 2003.

16. Giant must complete pressure testing all plant drain lines, sumps, including the tank farms, etc. by 6/1/03. – **No further sewer testing was completed in February or March 2003. We would like to propose completing 80% of the sewer testing by 12/31/03 and the last 20% by 12/31/2004.**

17. Giant must complete Discharge Plan submittal by 10/1/03 with monthly progress reports – **In progress. To be submitted by 6/15/03.**

18. RCA wants monthly progress reports. – This report for February and March 2003 will be the last submitted.

19. Issues of geological channels need to be resolved – To be resolved.

20. LWP to spell out in DP all samples to be taken from which wells and analysis, including frequency – **To be determined**.

Please feel free to contact me at 505.722.0227 or @ ***dmancini@giant.com*** with any questions or concerns you have regarding this report. Thank you for your assistance with our Discharge Plan submittal.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

Enc

CC: Roger Anderson, OCD
Dave Cobrain, HWB
Ed Riege, Env. Superintendent
Matthew Davis, General Manager (w/o enc.)
File

12/10/02 Meeting held with Giant-Ciniza: GW-032 Dorinda Mancini, Ed Riege, LWP, RCA, Dave Cobrain.

Minutes of meeting: OCD to require the following:

1. Three additional nested wells around ponds.

2. Investigate tank farm area near recovery wells and install possible French drain

3. Investigate around old OW-20 high PH area

4. Investigate past OW-29 Find possible channels

5. Inspect the truck center

6. Find out where old OW17 was located. Now closed was inside of tank farm. Sonsela wells were closed in this area.

7. Prevent run-off from old pond area.

8. Show drainage ditches on drawings

9. Submit storm water plan

10. Giant wants to monitor only OW-11,12,14,29, 30 + MW-4

11. Giants wants to close OW-2&3 replace with new ones

12. Giant does not want to monitor OW-1,9,10 RCA wants these wells to be checked to make sure they are still under Artesia conditions.

13. NMED (RCRA) wants MW-1,4,5 SWM-4 old LTU

14. RCA wants pond #2 to be sampled.

15. Old API must be rebuilt or demonstrate it is not leaking.

16. Giant must complete pressure testing all plant drain lines, sumps, including tank farms, etc. by June 1, 2003

17. Giant must complete DP submittal by Oct 1, 2003 with monthly progress reports.

18. RCA wants monthly progress report.

19. Issues of geological channels needs to be resolved.

20. LWP to spell out in DP all samples to be taken from which wells and analysis, including frequency.

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6929.2
TOTAL DEPTH: 35.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 21.2'
BORING ID: 0656
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.0	***//oo**		C	SAND, FINE, CLAYEY, FINE GRAVEL, BROWN, MOIST	0.0-23.0
1.0	***//oo**		C		0
1.0-4.5	///**oo//		C	CLAY, SLIGHTLY SANDY, SOME FINE GRAVEL, MOIST, RED BROWN, FIRM TO SOFT, NO ODOR,	
	///**oo//		C	SOME CHARCOALING	
	///**oo//		C		
	///**oo//		C		
	///**oo//		C	MORE GRAVELLY AT 1.5' TO 1.8'	
	///**oo//		C		
4.5	///**oo//		C		
4.5-4.8	****//***	5.0	C	SAND, FINE, DAMP, SLIGHTLY CLAYEY, PURPLISH BROWN, NO ODOR	
4.8-6.0	///***--/		C	CLAY, VERY SANDY, FINE, SILTY, NO ODOR, PURPLISH BROWN	
6.0	///***--/		C		
6.0-6.2	***//-***		C	SAND, FINE TO MEDIUM, CLAYEY, SLIGHTLY SILTY, MOIST, PURPLE RED, NO ODOR	
6.2-7.8	//***-+//		C	CLAY, VERY SANDY, FINE, SILTY, SOME CALCAREOUSLY INDURATED APPEARING NODULES, FINE	
	//***-+//		C	GRAVEL, SOME VEGETATION IN SAMPLE, DAMP TO MOIST, PURPLISH BROWN	
7.8	//***-+//		C		
7.8-8.5	***//-***		C	SAND, VERY FINE TO FINE, CLAYEY, SILTY, SOME CEMENTED SAND, MOIST, PURPLISH BROWN,	
8.5-8.8	///***///		C	CLAY, SAND, FINE, SAND APPEARS TO BE IN BANDS, NO ODOR, FIRM, MOIST	
8.8-9.2	***///***		C	SAND, FINE, CLAYEY, MOIST, PURPLISH BROWN, SLIGHT ORANGE TINT AT 8.8'	
9.2-11.5	///***///	10	C	CLAY, SANDY, FINE, SOME CHARCOALING AND GYPSUM SPOTS IN SAMPLE, MOIST, SOME ROOT	
	///***///		C	MATTER, HARD, NO ODOR	
	///***///		C		
	///***///		C		
11.5-12.2	///***///		C	CLAY, MOIST, HARD, SLIGHTLY SILTY, HEAVY CHARCOALING, VEGETATION, CALCAREOUS	
12.2	///***///		C	INDURATION OR GYPSUM NODULES, NO ODOR, PURPLISH BROWN	
12.2-14.2	***///***		C	INTERBEDDED SAND AND CLAY	
	///***///		C		
14.2	***///***		C		
14.2-17.0	///****//		C	CLAY, MOIST, PURPLISH BROWN, VERY SANDY, ORANGE SANDY BANDS IN CLAY, VERY THIN	
	///****//	15	C	LAYERS TO 15', NO ODOR, SOME CHARCOALING	
	///****//		C		
	///****//		C		
	///****//		C		
17.0	///****//		C		
17.0-17.5	***//-***		C	SAND, CLAYEY, SILTY, FINE, PURPLISH BROWN WITH ORANGE TINT, NO ODOR	
17.5-18.2	///--*///		C	CLAY, SILTY, SANDY, WET, PURPLISH BROWN, SOFT TO FIRM, SOME VEINING, POSSIBLE ROOTS	
18.2	///--*///		C	DARK GREEN, NO ODOR	
18.2-18.8	****-/***		C	SAND, FINE TO MEDIUM, PURPLISH WITH ORANGE BANDS, SOME BLACK BANDING, SILTY,	
18.8	****-/***		C	SLIGHTLY CLAYEY, NO ODOR	
18.8-19.7	////*-////	20	C	CLAY, MOIST, ROOT MATTER, PURPLISH BROWN, SLIGHTLY SANDY, SOME SILT, NO ODOR	
19.7-19.9	****--***		C	SAND, FINE, MOIST, ORANGE BROWN, SLIGHTLY SILTY, SOME PURPLING, NO ODOR	
19.9-21.2	///-**///		C	CLAY, WET, SLIGHTLY SILTY, SANDY, REDDISH PURPLE, FIRM, NO ODOR	
21.2-22.0	***-//***		C	SAND, FINE, WET, SLIGHTLY WATER BEARING, ORANGE BROWN TO PURPLE, NO ODOR, SLIGHTLY	
22.0	***-//***		C	SILTY, CLAYEY, MODERATELY DENSE	
22.0-22.4	/*/*/*/*/		C	INTERBEDDED CLAY AND SAND	
22.4-27.2	///*oo///		C	CLAY, MOIST, SLIGHTLY SANDY, SOME GYPSUM NODULES OR CEMENTED SAND, COARSE GRAVEL,	

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6929.2
TOTAL DEPTH: 35.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 21.2'
BORING ID: 0656
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
22.4-27.2	///*oo///		C	**CLAY**, MOIST, SLIGHTLY SANDY, SOME GYPSUM NODULES OR CEMENTED SAND, COARSE GRAVEL,	23.0-32.0
	///*oo///		C	WHITE, FINE, NO ODOR, REDDISH BROWN	0
	///*oo///		C		
	///*oo///	25	C		
	///*oo///		C		
	///*oo///		C		
	///*oo///		C		
27.2	///*oo///		C		
27.2-27.7	***/oo***		C	**SAND**, FINE TO MEDIUM, **SLIGHTLY WATER BEARING**, SLIGHTLY CLAYEY, FINE GRAVEL, REDDISH	
27.7	***/oo***		C	BROWN WITH PURPLE TINT, NO ODOR	
27.7-28.0	///--*///		C	**CLAY**, SILTY, MOIST TO WET, SLIGHTLY SANDY, RED BROWN, FIRM, NO ODOR	
28.0-28.8	oo//--**o		C	**GRAVEL**, FINE TO COARSE, CLAYEY, SILTY, SANDY, FINE, WET, SOME SANDSTONE NODULES,	
28.8	oo//--**o		C	BONE WHITE, NO ODOR	
28.8-29.0	///**oo//	30	C	**CLAY**, MOIST, SANDY, FINE GRAVEL, RED BROWN, STIFF, NO ODOR	
29.0-32.0	ooo***ooo		C	**GRAVEL**, FINE TO COARSE, SANDY, FINE TO COARSE, PURPLE BROWN, **WATER BEARING**, CLAYEY,	
	ooo***ooo		C	NO ODOR, 30.0'-32.0' MORE COARSE SAND, FINE GRAVEL, **WATER BEARING**	
	ooo***ooo		C		
32.0	ooo***ooo		C		3.0
32.0-35.0	===//*===		C	**CHINLE FORMATION**	
	===//*===		C	PURPLISH WITH LIGHT GREEN BANDING, CLAYEY, SOME SAND, FINE, SOME CEMENTED	
	===//*===		C	SAND AT 35.0', DRY	
	===//*===		C		
	===//*===		C		
35.0	===//*===	35	C		
TOTAL DEPTH					

Item #2

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6938.4
TOTAL DEPTH: 40.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 34.5'
BORING ID: 0657
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.8	///*o*o//		C	CLAY, DAMP, FIRM, SANDY, FINE, SOME FINE GRAVEL, RED BROWN, NO ODOR	0.0-31.0
	///*o*o//		C		0
	///*o*o//		C		
1.8	///*o*o//		C		
1.8-4.5	**-o-/o**		C	SAND, FINE TO COARSE, SILTY, SLIGHTLY CLAYEY, SOME FINE GRAVEL, RED BROWN, SOME	
	-o-/o		C	GYPSUM SPOTS, MORE COARSE SAND AT 4.0' TO 4.5', DAMP, NO ODOR	
	-o-/o		C		
	-o-/o		C		
4.5	**-o-/o**		C		
4.5-5.0	/*/*/*/*/	5.0	C	INTERBEDDED CLAY AND SAND	
5.0-5.9	/////////		C	CLAY, MOIST, SLIGHTLY BLOCKY, WHITE GYPSUM SPOTS, CHARCOALING, SOME ROOTS IN SAMPLE	
5.9	/////////		C	REDISH BROWN, VERY DARK TO PURPLE CHARCOALING, NO ODOR, VERY STIFF	
5.9-6.2	*********		C	SAND, FINE, SOME COARSE, RED BROWN WITH ORANGE TINT	
6.2-8.5	////-////		C	CLAY, MOIST, SLIGHTLY BLOCKY, WHITE GYPSUM SPOTS, CHARCOALING, SOME ROOTS IN SAMPLE	
	////-////		C	REDISH BROWN, VERY DARK TO PURPLE CHARCOALING, NO ODOR, VERY STIFF, SLIGHTLY SILTY	
	////-////		C		
	////-////		C		
8.5-10.0	////-////		C	CLAY, SILTY, SANDY, FINE, SOME GYPSUM SPOTTING, DAMP TO MOIST, REDDISH BROWN WITH	
	////-////		C	PURPLE TINT, VERY STIFF TO HARD, MORE FISSLE, NO ODOR, SOME CHARCOALING	
	////-////	10	C		
10.0-11.2	///-////		C	CLAY, MOIST, HARD, SLIGHTLY SILTY, SOME CHARCOAL, PURPLISH BROWN, DAMP TO MOIST,	
11.2	////-////		C	NO ODOR	
11.2-12.5	***--/***		C	SAND, FINE, SILTY, SLIGHTLY CLAYEY, PURPLISH BROWN, DAMP, NO ODOR	
	--/		C		
12.5	***--/***		C	SILTY AT 12.0'	
12.5-13.2	///--*///		C	CLAY, SILTY, SLIGHTY SANDY, FINE, SLIGHTLY FISSLE, DAMP, VERY STIFF, REDDISH BROWN	
13.2-13.8	***--//**		C	SAND, VERY FINE TO FINE, SILTY, CLAYEY, DAMP TO MOIST, RED BROWN, NO ODOR	
13.8	***--//**		C		
13.8-14.5	///**--//		C	CLAY, SANDY, VERY FINE, SITLY, DAMP TO MOIST, NO ODOR	
14.5-15.0	///**--//	15	C	CLAY, SANDY, FINE, PURPLISH BROWN WITH ORANGE TINT, VERY STIFF, NO ODOR, SILTY, DAMP	
15.0-15.2	***--/***		C	SAND, FINE, SILTY, SLIGHTLY CLAYEY, REDDISH PURPLE WITH ORANGE TINT, NO ODOR	
15.2-15.7	//--**//		C	CLAY, SILTY, SANDY, FINE, ORANGE BANDS OF SAND IN CLAY, DAMP TO MOIST, NO ODOR, RED	
15.7-18.2	////////		C	BROWN CLAY	
	////////		C	CLAY, HARD, MOIST, REDDISH BROWN, CHARCOALING, BLOCKY, SOME CEMENTED SAND AT 17.0',	
	////////		C	NO ODOR	
18.2	////////		C		
18.2-18.7	****-/***		C	SAND, FINE, SLIGHTLY SILTY AND CLAYEY, PURPLISH BROWN WITH ORANGE TINT, SOME BLACK	
18.7	****-/***		C	SAND IN BAND FORM	
18.7-20.0	///--***/		C	CLAY, SILTY, VERY SANDY, SAND IN ORANGE BANDS, PURPLE BROWN, DAMP TO MOIST, VERY	
	///--***/	20	C	STIFF, NO ODOR	
20.0-21.0	///---**/		C	CLAY, VERY SILTY, SANDY, FINE, DAMP TO MOIST, PURPLISH BROWN, NO ODOR	
	///---**/		C		
21.0-22.2	///***--/		C	CLAY, VERY SANDY, SILTY, SAND IN ORANGE COLOR, PURPLE BROWN, VERY STIFF, NO ODOR	
	///***--/		C		
22.2-23.5	///***-//		C	LESS SILTY, MORE WHITE GYPSUM SPOTS, SOME CHARCOALING	
	///***-//		C		

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6938.4
TOTAL DEPTH: 40.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 34.5'
BORING ID: 0657
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
22.2-23.5	///***-//		C	LESS SILTY, MORE WHITE GYPSUM SPOTS, SOME CHARCOALING	
23.5-24.5	///***-//		C	MORE SANDY, FINE, SILTY, ORANGE SAND, PURPLE BROWN CLAY	
24.5	///***-//		C		
24.5-25.0	***--//**	25	C	SAND, FINE, SILTY, CLAYEY, ORANGISH PURPLE, DAMP, NO ODOR	
25.0-26.2	////*-///		C	CLAY, MOIST, REDDISH BROWN WITH PURPLE TINT, SLIGHTLY SANDY, SOME CHARCOALING,	
26.2	////*-///		C	SLIGHTLY SILTY, HARD, NO ODOR	
26.2-26.7	***//--**		C	SAND, FINE, CLAYEY, SILTY, MOIST, ORANGISH BROWN, NO ODOR	
26.7-27.5	///***-//		C	CLAY, VERY SANDY, VERY FINE TO FINE, SILTY, ORANGE PURPLE, MOIST, HARD, NO ODOR	
27.5	///***-//		C		
27.5-28.5	***--/***		C	SAND, VERY FINE TO FINE, SILTY, CLAYEY, ORANGISH PURPLE, MOIST, NO ODOR	
28.5	***--/***		C		
28.5-28.8	////**///		C	CLAY, SILTY MOIST, VERY STIFF, SANDY, FINE, PURPLISH BROWN WITH ORANGE TINT, DAMP	
28.8-29.7	***--/***		C	SAND, FINE, SILTY, CLAYEY, SOME COARSE, DAMP, NO ODOR (FINE AND COARSE GRAVEL ZONE	
29.7	**-o-/o**	30	C	AT 29.2-29.5)	
29.7-30.5	///***-//		C	CLAY, VERY SANDY, SILTY, DAMP TO MOIST, FISSLE, PURPLE BROWN WITH SOME ORANGE AND	
30.5	///***-//		C	BLACK SAND, NO ODOR	
30.5-31.0	***---***		C	SAND, VERY FINE TO FINE, SILTY, MOIST, ORANGISH RED TO PURPLISH BROWN, NO ODOR	
31.0-33.8	///*--///		C	CLAY, SLIGHTLY SANDY, SILTY, WET, SOME CHARCOAL VEINS, STIFF, REDDISH BROWN	
	///*--///		C		30.0
	///*--///		C		
33.8	///*--///		C		170.0
33.8-35.9	oo//*Soo		C	GRAVEL, VERY CLAYEY, SANDY, FINE TO COARSE, SILTY GRAVEL IS FINE TO COARSE, SOME	
	oo//*Soo		C	SOFT SANDSTONE NODULES, SLIGHTLY WATER BEARING AT 34.5'	
	oo//*Soo	35	C	SLIGHTLY WATER BEARING AT 35.2'	200.0
	oo//*Soo		C		
35.9	oo//*Soo		C		
35.9-40.0	===///===		C	CHINLE FORMATION	
	===///===		C	CLAYEY, PURPLISH BROWN WITH LIGHT GREEN SPOTS, MOIST, BLOCKY	
	===///===		C		
	===///===		C		
	===///===		C		
	===///===		C		
	===///===		C		
40.0	===///===	40	C		
TOTAL DEPTH					

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6936.2
TOTAL DEPTH: 35.5'
LOGGED BY: TM
DATE: 6-11-97
STATIC WATER: NOT FOUND
BORING ID: 0658
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.5	///*o*o//		C	**CLAY**, SANDY, FINE, FINE TO COARSE GRAVEL, BROWN, DAMP, ROOTS IN SAMPLE, NO ODOR	ALL SAMPLES 0.0
	///*o*o//		C		
	///*o*o//		C		
1.5-3.5	///*o*o//		C	**CLAY**, SANDY, VERY FINE, SILTY, GYPSUM VEINS, RED BROWN, DAMP TO MOIST, SOME FINE GRAVEL, NO ODOR	
	///*o*o//		C		
	///*o*o//		C		
3.5	///*o*o//		C		
3.5-4.0	***/o/o**		C	**SAND**, FINE TO COARSE, CLAYEY, GRAVELLY, FINE AND COARSE, RED BROWN, DAMP, SOME BONE	
4.0	***/o/o**		C	WHITE CEMENTED SAND, NO ODOR	
4.0-4.2	////**///	5.0	C	**CLAY**, DRY TO DAMP, BROWN AND WHITE GYPSUM VEINS, STIFF, SLIGHTLY SANDY	
4.2-4.7	***o/o/**		C	**SAND**, FINE TO COARSE, SOME FINE GRAVEL, RED BROWN, CLAYEY, DAMP, NO ODOR	
4.7-5.0	////////		C	**CLAY**, DAMP, BROWN AND WHITE GYPSUM VEINS, BLOCKY, STIFF, NO ODOR	
5.0-8.2	***oo-***		C	**SAND**, FINE TO COARSE, FINE GRAVEL, RED BROWN, DAMP, SLIGHT ORANGE TINT, SLIGHTLY	
	oo-		C	SILTY, NO ODOR	
	oo-		C		
8.2	***oo-***		C		
8.2-9.3	///--*///		C	**CLAY**, SILTY, SLIGHTLY SANDY, FINE, BROWN, SOME VEINING, ROOTS IN SAMPLE, DAMP TO	
	///--*///		C	MOIST, NO ODOR	
9.3	///--*///		C		
9.3-16.0	****/-***	10	C	**SAND**, FINE, SOME COARSE, SLIGHTLY CLAYEY, SILTY, REDDISH BROWN, DAMP, NO ODOR	
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C	ORANGE SAND AT 13.0' TO 13.2'	
	oo//-		C	**VERY GRAVELLY**, FINE, MORE CLAYEY, SILTY AT 13.5' TO 15.0'	
	oo//-		C		
	oo//-	15	C		
	oo//-		C		
16.0	**oo//-**		C		
16.0-16.7	///--**//		C	**CLAY**, SILTY, SANDY, FINE, SOME GYPSUM SPOTS, PURPLISH BROWN, SOME ROOT MATTER,	
16.7	///--**//		C	STIFF, DAMP, NO ODOR	
16.7-19.8	***o*o***		C	**SAND**, FINE TO COARSE, SOME FINE GRAVEL, DAMP, PURPLISH BROWN, SOME CEMENTED SAND,	
	o*o		C	NO ODOR	
	o*o		C		
	o*o		C		
	o*o		C		
	o*o	20	C		
19.8-21.7	***o*o***		C	**SAND**, MEDIUM TO COARSE, SOME FINE, CLAYEY, RED BROWN, SOME FINE GRAVEL, DAMP, DENSE	
	o*o		C	CEMENTED SAND, NO ODOR	
21.7	***o*o***		C		
21.7-22.0	---**//--		C	**SILT**, SANDY, VERY FINE TO FINE, CLAYEY, PURPLISH BROWN, DAMP, STIFF, SAND IS BANDED	
22.0-22.2	****--***		C	**SAND**, FINE, SLIGHTLY SILTY, DAMP, PURPLISH BROWN WITH ORANGE TINT, NO ODOR	
22.2-23.8	///--**//		C	**CLAY**, SILTY, SANDY, FINE, SOME WHITE SPOTS, PURPLE BROWN, DAMP, NO ODOR	

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6936.2
TOTAL DEPTH: 35.5'
LOGGED BY: TM
DATE: 6-11-97
STATIC WATER: NOT FOUND
BORING ID: 0658
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
22.2-23.8	///--**//		C	CLAY, SILTY, SANDY, FINE, SOME WHITE SPOTS, PURPLE BROWN, DAMP, NO ODOR	
23.8-24.0	****--***		C	SAND, VERY FINE TO FINE, SILTY, LIGHT BROWN, DAMP, NO ODOR	ALL SAMPLES
24.0-26.7	///**-///		C	CLAY, SANDY, SILTY, DAMP TO MOIST, PURPLISH BROWN, SOME GYPSUM SPOTS, NO ODOR	0.0
	///**-///	25	C		
	///**-///		C		
	///**-///		C		
	///**-///		C		
26.7-28.2	////**///		C	CLAY, WET, RED BROWN, FIRM, SLIGHTLY SANDY, NO ODOR	
	////**///		C		
	////**///		C		
28.2-29.0	///*o*o//		C	CLAY, SANDY, WET, GRAVELLY, FINE, REDDISH PURPLE, SOME WHITE MEDIUM GYPSUM, NO ODOR	
29.0	///*o*o//		C		
29.0-29.2	ooo***ooo		C	GRAVEL, COARSE, CEMENTED SAND, COARSE, BONE WHITE, MOIST, WHITE, NO ODOR	
29.2-30.5	//o*-s///	30	C	CLAY, WET, GRAVELLY, FINE TO COARSE, SANDY, FINE, SILTY, SANDSTONE, FINE GRAVEL,	
30.5	//o*-s///		C	BONE WHITE, RED BROWN, NO ODOR, MORE GRAVELLY AT 30.0' TO 30.5', NOT WATER BEARING	
30.5-35.5	=========		C	CHINLE FORMATION	
	=========		C	SHALE, RED BROWN, FISSLE, DAMP, HARD	
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========	35	C		
35.5	=========		C		
TOTAL DEPTH					

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6932.1
TOTAL DEPTH: 20.0'
LOGGED BY: WHK
DATE: 6-11-97
STATIC WATER: 10.0'
BORING ID: 0659
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-3.5	///*o*o//		C	**CLAY**, SANDY, FIRM, SOME SCATTERED FINE GRAVEL, MOIST	0.0-12.0
	///*o*o//		C		0
	///*o*o//		C		
	///*o*o//		C		
	///*o*o//		C		
	///*o*o//		C		
3.5	///*o*o//		C		
3.5-7.5	////*////		C	**CLAY**, WET, STIFF, SOME CARBONATE FILIMENTS, VERY SLIGHTLY SANDY, RED BROWN	
	////*////		C		
	////*////	5.0	C		
	////*////		C		
	////*////		C		
	////*////		C		
	////*////		C		
7.5	////*////		C		
7.5-8.0	ooS/S/Soo		C	**GRAVEL**, CLAYEY, MAINLY SANDSTONE, FIRM, WET, RED BROWN	
8.0-9.5	****oo***		C	**SAND**, FINE, MODERATLY DENSE, BROWN, SCATTERED FINE GRAVEL, MOIST	
	****oo***		C		
9.5	****oo***		C		
9.5-10.0	ooo//SSoo	10	C	**GRAVEL**, CLAYEY, SANDSTONE AND CHERT, SOME FINE, RED BROWN, DENSE	
10.0-11.0	****//***		C	**SAND**, FINE, SLIGHTLY CLAYEY, **SLIGHTLY WATER BEARING**, SOFT, RED BROWN	
11.0	****//***		C		
11.0-15.3	////*-///		C	**CLAY**, FIRM, WET (NOT WATER BEARING), VERY SLIGHTLY SANDY TO SILTY, BROWN TO RED BROWN	
	////*-///		C		
	////*-///		C		150
	////*-///		C		
	////*-///		C		
	////*-///		C		
	////*-///		C		
15.3	////*-///	15	C		
15.3-15.6	oooo$$ooo		C	**GRAVEL**, DENSE, RED BROWN, SANDSTONE AND CHERT, MOIST, GRAVEL ROUNDED (TO 1")	5
15.6-20.0	=========		C	**CHINLE FORMATION**	0
	=========		C	**SHALE**, DENSE, RED BROWN, MOIST, FISSLE, SOME GREEN REDUCTION SPOTS	
	=========		C		0
	=========		C		
	=========		C		0
	=========		C		
	=========		C		0
	=========		C		
20.0	=========	20	C		0
TOTAL DEPTH					

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6934.9
TOTAL DEPTH: 45.0'
LOGGED BY: WHK
DATE: 6-12-97
STATIC WATER: 32.0'
BORING ID: 0665
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-9.0	///x/x///		C	CLAY, WET, RED BROWN, STIFF, SOME TRASH (METAL PIPE, PLASTIC) IN UPPER 2'	
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///	5.0	C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
9.0	///x/x///		C		
9.0-17.0	///***///		C	CLAY, SANDY, WET, RED BROWN, FIRM	
	///***///	10	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///	15	C		
	///***///		C		
	///***///		C		
	///***///		C		
17.0	///***///		C		
17.0-24.5	////**///		C	CLAY, SLIGHTLY SANDY, WET, FIRM, BROWN	
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///	20	C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6934.9
TOTAL DEPTH: 45.0'
LOGGED BY: WHK
DATE: 6-12-97
STATIC WATER: 32.0'
BORING ID: 0665
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
17.0-24.5	////**///		C	CLAY, SLIGHTLY SANDY, WET, FIRM, BROWN	
	////**///		C		
24.5	////**///		C		
24.5-28.0	*********	25	C	SAND, FINE, DAMP TO MOIST, RED BROWN, "SWEET" ODOR (POSSIBLE ADDITIVE OR LIGHT END)	
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
28.0	*********		C		
28.0-34.3	ooo*S*Soo		C	GRAVEL, SANDY (SANDSTONE, CHERT), STRONG GASOLINE ODOR (OLD), MOIST TO WET, NOT WATER BEARING, BROWN	
	ooo*S*Soo		C		
	ooo*S*Soo		C		
	ooo*S*Soo	30	C		
	ooo*S*Soo		C		
	ooo*S*Soo		C		
	ooo*S*Soo		C		
	ooo*S*Soo		C		
	ooo*S*Soo		C	WATER BEARING AT 32.0'- 33.5'	
	ooo*S*Soo		C		
	ooo*S*Soo		C		
34.3	ooo*S*Soo		C		
34.3-34.5	/////////		C	CLAY, WET, SOFT, BROWN, NO ODOR	
34.5-35.0	*********	35	C	SAND, FINE, WET, BROWN, NO ODOR, MODERATELY DENSE	
35.0-41.0	ooo***ooo		C	GRAVEL, SANDY, BROWN, WET, NOT WATER BEARING, POSSIBLE WEAK "SWEET" ODOR	
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo		C		
	ooo***ooo	40	C		
	ooo***ooo		C		
41.0	ooo***ooo		C		
41.0-45.0	=========		C	CHINLE FORMATION	
	=========		C	SHALE, SANDY, RED, SOME RED SPOTS, DRY, HARD	
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
45.0	=========	45	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6911.3
TOTAL DEPTH: 15.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0668
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.5	///**oo//		C	**CLAY**, SANDY, FINE, GRAVELLY, DRY, RED BROWN, SOFT	ALL SAMPLES NO ODOR
	///**oo//		C		
1.5	///**oo//		C		
1.5-9.0	///***///		C	**CLAY**, SANDY, RED BROWN, DRY, HARD, WHITE CARBONATE FILAMENTS, ROOT MATTER	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///	5.0	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
9.0	///***///		C		
9.0-11.0	///*o*///		C	**CLAY**, SANDY, RED BROWN, SOFT, WET, SANDIER THAN ABOVE, SOME FINE GRAVEL, SOME CARBONATE NODULES	
	///*o*///	10	C		
	///*o*///		C		
11.0	///*o*///		C		
11.0-11.7	ooo**/Soo		C	**GRAVEL**, SANDY, CLAYEY, (SANDSTONE, CHERT), MOIST, RED BROWN, DENSE	
11.7-15.0	=========		C	**CHINLE FORMATION**	
	=========		C	**SHALE**, RED BROWN TO PURPLE, SOME GREEN REDUCTION SPOTS, DENSE TO HARD, MOIST TO DRY	
	=========		C	FURTHER DOWN	
	=========		C		
	=========		C		
	=========		C		
15.0	=========	15	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.
P.O. BOX 422 • LAS CRUCES, NM 88004
Ph: (505) 523-7674
FAX: (505) 523-7248 • E-mail: werpei@aol.com

October 20, 1998

Ms. Dorinda Mancini
Giant Refining Company
Ciniza Refinery
Route 3, Box 7
Gallup, New Mexico 87301

Re: Well Closure Procedures

Dear Ms. Mancini,

As you are aware there a variety of monitoring well installation types at the Ciniza Refinery site. The following summarizes a proposed task scenario for a typical well closure at the Ciniza facility.

Task I: Remove all surface vaults and protective casings.

Task II: Determine if the casing has been grouted into the formation.

A: If the casing has been grouted a determination will be made as to the potential for pulling the casing. If the casing cannot be safely extracted or cannot be extracted with reasonable effort, proceed to Task III.

B: If the casing has not been grouted in place, an attempt to pull the casing will be made. If the casing cannot be pulled, the casing will be split to expose the drilling annulus. The casing will be split to a point just above the screens or perforations.

Task III: Grout tremmie tubing will be placed to the bottom of the well with a packer set just above the screens. A light grout consisting of a fluidized portland cement/montmorillonite clay (bentonite) mix will be injected into the screened zone. The grout mix will be pumped into the well and monitored for pressure and volume. The grout will be injected until the injection volume is equal to 1.5 times the calculated volume of the well and pressures indicate intrusion into the formation. A heavy grout will then be injected into the well until pump pressure stabilizes. Injection will stop, pressure will be allowed to drop, the packer(s) will be removed.

A: If the casing has been grouted in place, the remainder of the casing will then be grouted to the surface with a heavy fluidized portland cement/montmorillonite clay (bentonite) grout.

B: If the casing has not been grouted in place, the remaining annulus will be filled with a light grout as described above followed by a heavy grout when the annulus has stopped taking the light grout.

Task IV: The grout will be allowed to cure twenty four (24) hours. Any shrink back will then be filled with grout to the surface.

Task V: A closeout report will be provided to the client for final filing.

If you have any questions or comments, please call our office.

Sincerely,
Precision Engineering, Inc.

William H. Kingsley, P.E.

Item #3

PRECISION ENGINEERING, INC.

505-523-7674

Well Closure Report

Well Identification: OW-20

Date of Closure: JANUARY 15, 1999

Water Depth At Closure: 32.10' Below Ground Surface

Length of Casing Extracted: 0 ft Interval: -- to --

Length of Perforated Casing: 0 ft Interval: -- to --

Length of Screen Extracted: 0 ft Interval: -- to --

Well Diameter: 4 in Interval: 0 to 59 (measured)

-- in Interval: -- to --

-- in Interval: -- to --

-- in Interval: -- to --

Gravel or Sand Pack Length: 14 ft Interval: 50 to 64
(reported)

-- ft Interval: -- to --

-- ft Interval: -- to --

-- ft Interval: -- to --

Estimated Sand/Gravel Pack Void Ratio: 0.45

Estimated Total Well Volume (Including Sand/Gravel Pack): 21.4 ft³

Volume of Grout: 1) 35.8 ft³ Type: 11#-Portland Type I-II/Bentonite

Bentonite 6%

Interval: >50' to ____

pth: 59'

2) #3 ortland Type I-II/Bentonite

onite 6%

0 to 59'

epth: 59'

3 --

--

: -- to --

Depth: --

Total Grout Volum -eman: William Kingsley

Notes: Grout shrink back @ 24 hr - 0.5'

GROUT VOLUME FOR OW-2D 1-15-99

ESTIMATE

RST 9" ANNULUS - (DRILLED W 7 5/8" OD HSA)

VOLUME OF ANNULUS:

ASSUME BORING EXTENDED TO 83' & BACKFILLED W/CUTTINGS TO 64' - CUTTING VOID RATIO = 0.65

$$\text{VOLUME } 83-64 = \left[(83-64)(0.65)\right]\left[\frac{\pi\left(\frac{9}{12}\right)^2}{4}\right] = 5.5 \text{ FT}^3$$

VOLUME OF GRAVEL PACK -

$$\text{VOLUME } 64-50 = \left[(64-50)(0.45)\right]\left[\frac{\pi\left(\frac{9}{12}\right)^2}{4}\right] = 2.8 \text{ FT}^3$$

VOLUME TO SURFACE

$$\text{VOLUME } 50-0 = \left[50-0\right]\left[\frac{\pi\left(\frac{4}{12}\right)^2}{4}\right] = 13.1 \text{ FT}^3$$

TOTAL VOLUME = 21.4 FT^3

BORING OW-20

SURFACE ELEVATION: 6961 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

PENETRATION RATE MINUTES/FOOT

SYMBOLS		DESCRIPTION
5.0 / 1.2	FILL	FILL
1.3 / 1.7 / 1.5 / 1.5 / 1.9	CL	TRIASSIC PERIOD CHINLE FORMATION GRAY SILTY, FINE SANDY CLAY, SOFT, HIGHLY WEATHERED GRADES WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE FROM 29 FEET
3.3 / 3.0 / 2.7 / 4.0 / 2.3 / 3.4	SHALE	40 FEET: SHALE, REDDISH BROWN, SILTY, WITH SOME FINE SAND, AND OCCASIONAL THIN INTERBEDS OF SANDSTONE AND LIMESTONE, SOFT, FRESH
1.6 / 3.2	MS	60 FEET: MUDSTONE, REDDISH BROWN, INTERBEDDED WITH LAMINAE OF WHITE TO LIGHT BROWN SANDSTONE, SOFT, FRESH
6.3 / 6.0 / 6.3	SS	70 FEET: SANDSTONE, BROWN, COARSE-GRAINED, COMPOSED OF QUARTZ WITH MINOR CHERT, AND LIMESTONE, HARD, FRESH
		SHALE 82 FEET: SHALE, GRAY, SILTY WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 83.0 FEET ON 12/19/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 54.0 TO 64.0 FEET.
GRAVEL PLACED FROM 50.0 TO 64.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 50.2 FEET BELOW GROUND ON 1/5/81.

FILE COPY

LOG OF BORINGS

DAMES & MOORE

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 1 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 20.0
LOGGED BY: WHK
DATE: 1-14-99
STATIC WATER:
BORING ID: OW-20R1
PAGE: 1 of 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0	///**/////			Clay, very fine sandy, some gravel, wet red-brown.	
	///**/////				
1.5	///**/////				
1.5	***//****			Sand, fine, clayey, moist, red-brown.	
2.7	***//****				
2.7	ooo//oooo			Gravel, sandstone, clayey, moist, red-brown.	
3.5	ooo//oooo				
3.5	//////////			Clay, weak carbonate nodules, hard, wet, red-brown.	
	//////////				
	//////////	5.0			
5.5	//////////				
5.5	///*//*//			Clay, sandy, firm, wet, red-brown.	
	///*//*//				
	///*//*//				
	///*//*//				
	///*//*//				
8.3	///*//*//				
8.3	**o**o**o			Sand, coarse, gravelly, dense, moist, light brown.	
	oo**o				
	oo**o	10			
	oo**o				
	oo**o				
	oo**o				
	oo**o				
	oo**o				
	oo**o				
13.5	**o**o**o				
13.5	*o*o*o*o*			Sand/Gravel, coarse, water bearing (weak), dark grey.	
14.5	*o*o*o*o*				
14.5	//////////	15		Clay, soft, wet, not water bearing, grey/black.	
15.0	*********			Sand, fine, loose, water bearing, black.	
15.9	*********				
15.9	///*///*/			Clay, slightly sandy, firm, wet not water bearing, red-brown.	
	///*///*/				
	///*///*/				
	///*///*/				
18.8	///*///*/				
18.8	//*//*//*			Clay, sandy, soft, saturated, glistening (does not make water),	
	//*//*//*			black mottled.	
20.0	//*//*//*	20			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8- OD HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 2 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 335.0
LOGGED BY: WHK
DATE: 1-15-99
STATIC WATER: 29.0
BORING ID: OW-20 Rep
PAGE: 1 of 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0-12.5	**********			Sand, coarse, sandstone gravel up to three inches at five feet, medium dense, moist, red-brown.	No odor
	**********	5.0			
	**********	10		more dense	
12.5	**********				
12.5	////////////			Clay, fine sandy, soft to firm, wet (not water bearing), red-brown, laminar banded.	
	////////////	15			
15.4	////////////				
15.4	//--**--/			Clay, very silty, fine sandy, soft, wet, red brown.	
17.2	//--**--/				
17.2	**********			Sand, fine, loose, brown.	
17.5	**********				
17.5	//**--**/			Clay, fine sandy, very slightly silty, soft, wet, red-brown.	
	//**--**/	20			
23.2	//**--**/				

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8" OD HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 2 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 35.0
LOGGED BY: WHK
DATE: 1-15-98
STATIC WATER: 29.0
BORING ID: OW-20 rep
PAGE: 2 of 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.2	//////////	23		**Clay,** soft, wet, red-brown.	No Odor
24.0	//////////				
24.0	**-**-**-			**Sand,** fine, silty, loose, wet (very weak water bearing?), grey overall	Fetted
25.0	**-**-**-	25		with black bands.	Odor
25.0	**********			**Sand,** fine, silty, loose, **water bearing**, brown/grey.	
26.4	**********				
26.4	//-//-//-			**Clay,** silty, soft, wet, not water bearing, some grey/black banding.	
27.5	//-//-//-				
27.5	**********			**Sand,** fine, loose, **water bearing,** grey/black.	
28.0	**********				
28.0	//*//*//*			**Clay,** fine sand, stiff, wet, not water bearing, red-brown/grey,	
28.9	//*//*//*				
28.9	**/**/**/	30		**Sand,** clayey, loose, wet, not water bearing, grey.	
	//**/				
	//**/				
	//**/				
31.9	**/**/**/				
31.9	**o**o**o			**Sand,** gravel (sandstone and chert, some degraded shale), moderately dense,	No Odor
	oo**o			wet, not water bearing, dark grey, 3 inch sandstone layer at 33.2-33.5.	
33.5	**o**o**o				
33.5	---------			**Shale,** some reduction mottling, fine blocky, hard, damp to moist, red-brown.	

35.0	---------	35		[CHINLE FORMATION] WHK	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8 OD HSA

5 of OW 14

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6918.6
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 28.0
BORING ID: B1
PAGE: 1

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.2	***///***		C	Sand, clayey, damp, brown, soft/loose, some fine gravel	0.0
	///	1.0	C		
1.2-5.0	///**--//		C	Clay, sandy, silty, moist to wet, brown, stiff, some root fibers in upper 3'	0.0
	///**--//		C	no odor	
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
5.0-8.8	///---///	5.0	C	Clay, silty, moist, brown, hard, scattered root fibers	0.0
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
8.8-9.1	ooo///ooo		C	Gravel, fine, clayey, damp, brown, dense, silica gravel to 1/2", no odor	0.0
9.1-10.0	///***///	9.0	C	Clay, sandy, damp, brown, hard, some root matter, no odor	0.0
	///***///		C		
10.0-12.4	/////////	10	C	Clay, blocky, moist to wet, brown, hard, root matter, gradational above and below	0.0
	/////////		C		
	/////////		C		
	/////////		C		
	/////////	12	C		
12.4-16.4	///---**//		C	Clay, silty, sandy, sandier @ 14' but gradational, moist to wet, brown, stiff to	0.0
	///---**//		C	hard, does not appear weathered in-situ, slightly fissured, pieces (2-3 mm) of	
	///---**//		C	clay in sandy matrix, root matter	
	///---**//		C		
	///---**//		C		
	///---**//	15	C		
	///---**//		C		
	///---**//	16	C		
16.4-16.7	*********		C	Sand, fine, moist, red brown, loose	0.0
16.7-17.4	///***///	17	C	Clay, sandy, wet, brown, very stiff	
17.4-22.9	///++////		C	Clay, slightly fissured but not as much as above, some 4" slightly sandy zones	0.0
	///++////		C	some carbonate nodules, wet, dark brown, hard	
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///**++//		C	Clay, slightly sandy, some carbonate filaments, occasional individual coarse sand	0.0
22.9-30.0	///**++//		C	grains of silica rock, wet, dark brown, soft, no odor, free water on tip of sample	
	///**++//	23	C	but not in samples	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6918.6
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 28.0
BORING ID: B1
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	///**++//		C	continued from page 1	
	///**++//	24	C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
30.0-32.5	***/o****	30	C	Sand, slightly clayey, occasional pebbles, weakly water bearing, brown, very	0.0
	/o*		C	soft/loose	
	/o*		C		
	/o*		C		
	/o*	32	C		
32.5-39.5	///---+//		C	Clay, silty, some carbonate filaments and staining, more carbonate filaments below	0.0
	///---+//		C	32', wet, saturated but not water bearing, light brown, soft to firm	
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//	39	C		
39.5-41.1	///ooo///		C	Clay, gravelly, wet, saturated but not water bearing, light brown, soft	0.0
	///ooo///		C		
	///ooo///		C		
	///ooo///	41	C		
41.1-47.1	***oo****		C	Sand, coarse, fine to medium gravelly, water bearing, brown, dense, subrounded	0.0
	oo*		C	to rounded silica rock, some sandstone pieces	
	oo*		C		
	oo*		C		
	oo*		C		
	oo*		C		
	oo*		C		
	oo*		C		
	oo*		C		
	oo*		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6918.6
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 28.0
BORING ID: B1
PAGE: 3

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	000		C	continued from page 2	
	000	47	C		
47.1-50.0	---------		C	CHINLE FORMATION	
	---------		C	Shale, some green mottling, fissle, moist, hard, slightly blocky, no odor	0.0
	---------		C		
	---------		C		
	---------		C		
	---------	50	C		
TD				end 11:00a -- depth to water @ 12:15p 28.0'	
				grout hole with bentonite/cement/8% grout to surface	
				time end 1:15p -- water depth affected by hole collapse	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

Dye w Propane Bullet Tank

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6917.6
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 22.3
BORING ID: B3
PAGE: 1

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.3	///**00//		C	Clay, sandy, gravelly, wet, brown, soft, no odor	0.0
	///**00//	1.0	C		
1.3-2.7	///**////		C	Clay, fine sandy, wet, brown to red brown, soft, no odor	0.0
	///**////	2.0	C		
2.7-5.0	/////////		C	Clay, wet, very soft, some root matter	0.0
	/////////	3.0	C		
	/////////		C		
	/////////		C		
	/////////		C		
5.0-8.4	/////////	5.0	C	Clay, wet, dark brown, stiff, no odor, some root matter	0.0
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////	8.0	C		
8.4-10.3	///+++///		C	Clay, carbonate filaments common, some carbonate nodules scattered, wet, stiff	0.0
	///+++///	9.0	C	red brown, no odor	
	///+++///		C		
	///+++///	10	C		
10.3-10.6	///000///		C	Clay, gravelly, wet, red brown, stiff, no odor	0.0
10.6-12.9	///**+--/	11	C	Clay, fine sandy, silty, wet, light red brown, firm, no odor, scattered fine	0.0
	///**+--/		C	gravel, some root matter, some carbonate filaments, slightly blocky	
	///**+--/		C		
12.9-14.1	///*+++//		C	Clay, slightly sandy, carbonate filaments abundant, wet, brown, firm, carbonate	0.0
	///*+++//	13	C	filaments stain sample, white CCI2, no odor, root matter abundant	
	///*+++//		C		
14.1-14.4	*********	14	C	Sand, fine, moist, light brown, loose, no odor	0.0
14.4-15.3	//***+--/		C	Clay as at 12.9'-14.1' but slightly more fine sand, no odor	0.0
	//***+--/	15	C		
15.3-16.7	***/*****		C	Sand, fine, slightly clayey, moist to wet, brown, loose, no odor	0.0
	/**	16	C		
16.7-18.3	///**////		C	Clay, fine sandy in laminations, wet, dull brown, soft, root matter common, no odor	0.0
	///**////	17	C		
	///**////		C		
	///**////	18	C		
18.3-18.9	/////////		C	Clay, blocky, slabby, wet, dull brown, firm, no odor	0.0
18.9-20.0	///***///	19	C	Clay, very sandy, wet, brown, soft	0.0
	///***///		C		
20.0-24.4	***000***	20	C	Sand, very gravelly, rounded to subrounded silica rock, some sandstone white, some	5 (upper 6")
	000		C	odor in upper 5", stained black to dark grey, water bearing, dense, multicolored	
	000		C	red brown matrix	
	000		C		
	000		C		
	000		C		
	000		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6917.6
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 22.3
BORING ID: B3
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	000		C		
	000	24	C		
24.4-25.0	---***---		C	CHINLE FORMATION	
	---***---	25	C	Shale, very sandy, weathered, grey, green, no odor, hard	0.0
25.0-30.0	---**-----		C	Shale, sandy, fissle, some green grey streaks, moist, hard	0.0
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----		C		
	---**-----	30	C		
TD				stop drilling @ 4:05p	
				water @ 4:20p -- 22.3'	
				grout to surface with bentonite/cement	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8/22/96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLR	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.0	////////// //////////		C C	CLAY, LOOSE, DRY, SOFT, RED BROWN	
1.0-1.6	***///***		C	SAND, CLAYEY, DARK BROWN, MOIST, SOFT, APPEARS CONTAMINATED	
1.6-6.3	////////// ////////// ////////// ////////// ////////// ////////// ////////// ////////// ////////// //////////	5.0	C C C C C C C C C C	CLAY, RED BROWN, FIRM, SOME ROOT MATTER, MOIST	
6.3-8.5	///***/// ///***/// ///***/// ///***/// ///***///		C C C C C	CLAY, SANDY, VERY FINE, MOIST, FIRM, RED BROWN, SOME ROOT MATTER	
8.5-12.3	////////// ////////// ////////// ////////// ////////// ////////// ////////// ////////// ////////// //////////	10	C C C C C C C C C C	CLAY, FIRM, RED BROWN, MOIST	
12.3-12.5	///**-///		C	CLAY, SANDY, SILTY, GRADES TO SILT @ 12.5	
12.5-13.3	---------		C	SILT, DRY, FIRM, MOIST, LIGHT BROWN	
13.3-13.5	///---///		C	CLAY, SILTY	
13.5-13.75	*********		C	SAND, LOOSE, DRY, FINE, BROWN	
13.75-15.8	////*//// ////*//// ////*////	15	C C C	CLAY, WEAKLY SANDY, BROWN, STIFF, MOIST	
15.8-16.7	///***/// ///***///		C C	CLAY, VERY SANDY (COARSE), WET (NOT WATER BEARING), FIRM, RED BROWN	
16.7-17.75	///---/// ///---///		C C	CLAY, SILTY, STIFF, MOIST, RED BROWN	
17.75-21.8	////////// ////////// ////////// ////////// ////////// ////////// ////////// ////////// ////////// //////////	20	C C C C C C C C C C	CLAY, WET, RED BROWN, STIFF, SOME ROOT MATTER	
21.8-25.3	///***/// ///***/// ///***///		C C C	CLAY, FINE SANDY, WET, HYDROCARBON ODOR, GREY BROWN, SOME BLACK MOTTLING, NOT WATER BEARING, SOFT	22'-20 ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8-22-96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.8-25.3	///***/// ///***/// ///***/// ///***/// ///***///	25	C C C C C	**CLAY**, FINE SANDY, WET, HYDROCARBON ODOR, GREY BROWN, SOME DARK MOTTLING, NOT WATER BEARING, SOFT	22'-20 ppm 24'-29 ppm
25.3-27.0	****/**** ****/**** ****/**** ****/****		C C C C	**SAND**, LOOSE, VERY WET, VERY WEAKLY FLUID BEARING, HYDROCARBON SHEEN, GREY BROWN, CLAYEY	26'-34ppm
27.0-28.1	****/**** ****/****		C C	AS ABOVE BUT RED BROWN, LESS ODOR	
28.1-29.5	///**//// ///**//// ///**////		C C C	**CLAY**, SLIGHTLY SANDY, SOFT, WET, NOT WATER BEARING	28'-48ppm
29.5-31.4	***///*** ***///*** ***///***	30	C C C	**SAND**, CLAYEY, SOFT, WET, NOT WATER BEARING, CANNOT DETECT ODOR, VERY WEAK WATER BEARING	30'-0ppm
31.4-34.8	///***/// ///***/// ///***/// ///***/// ///***/// ///***/// ///***/// ///***///		C C C C C C C C	**CLAY**, SANDY, FINE, SOFT, WET (NOT WATER BEARING), VERY WEAKLY SANDY > 33.0'	32'-0ppm 34'-0ppm
34.8-36.1	***--**** ***--**** ***--****	35	C C C	**SAND**, BROWN, SILTY, GRAVELLY (1"), MOIST, NO ODOR, MODERATELY DENSE **WATER BEARING** 35.0-36.1, NO ODOR	
36.1-41.2	///////// ///////// ///////// ///////// ///////// ///////// ///////// ///////// /////////	40	C C C C C C C C C	**CLAY**, LIGHT BROWN, CARBONATE SALTS APPEAR AS WEB-LIKE FILIMENTS, SOME ROOT MATTER, STIFF	36'-0ppm 38'-0ppm 40'-0ppm
41.2-42.7	000000000 000000000 000000000		C C C	**GRAVEL (2")**, CHERT, SANDSTONE, PETRIFIED WOOD, **WATER BEARING**, MULTICOLORED	
42.7-48.0	========= ========= ========= ========= ========= ========= =========	45	C C C C C C C	**SHALE**, RED, DRY/MOIST/WET, DENSE **CHINLE FORMATION**	42'-20ppm 44'-30ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4"ID Hollow Stemmed Auger

PROJECT: Giant Refinery Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8-22-96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
42.7-48.0	=========		C	SHALE, RED, DRY/MOIST/WET, DENSE	
	=========		C	CHINLE FORMATION	46'-10ppm
	=========		C		
	=========		C		
	=========		C		
48.0-50.0	=========		C	SHALE, DARK RED TO PURPLE RED, DRY, DENSE	48'-0ppm
	=========		C		
	=========		C		
	=========	50	C		50'-0ppm
TOTAL DEPTH					
		55			
		60			
		65			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6917.6
TOTAL DEPTH: 36.5
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 19' @ 27 HRS
BORING ID: 0648
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-6.2	///--////		C	CLAY, SLIGHTLY SILTY, ROOT MATTER, RED, BROWN, STIFF, MOIST	PID-0ppm ALL SAMPLES
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////	5.0	C		
	///--////		C		
6.2	///--////		C		
6.2-7.1	***///***		C	SAND, CLAYEY, GRADATIONALLY CONTACTS TOP, LOOSE, DRY, RED BROWN	
7.1	***///***		C		
7.1-8.3	///---///		C	CLAY, VERY SILTY, LAMINAR SILT, DRY-DAMP, FIRM, RED BROWN	
	///---///		C		
8.3	///---///		C		
8.3-12.3	---///---		C	SILT, CLAYEY, LAMINAR, DAMP-DRY, LIGHT BROWN, FIRM, ROOT MATTER	
	---///---		C		
	---///---	10	C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
12.3	---///---		C		
12.3-12.8	***---***		C	SAND, SILTY, FINE, LOOSE, DRY, RED BROWN	
12.8-14.3	///---///		C	CLAY, SILTY, STIFF, DAMP, ROOT MATTER, RED BROWN, SILT LAMINAR	
	///---///		C		
14.3	///---///		C		
14.3-16.5	***00****	15	C	SAND, FINE, SCATTERED GRAVEL TO 2", SILTY, RED BROWN, MODERATELY DENSE, DRY-DAMP	
	00*		C		
	00*		C		
16.5	***00****		C		
16.5-21.5	***SS****		C	SAND, COARSE-FINE, WET, SOME SANDSTONE GRAVEL TO 3", RED BROWN, SOME CLAY @ 19.5-20.0, WATER BEARING @ 20.0	
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*	20	C		
	SS*		C		
	SS*		C		
21.5	***SS****		C		
21.5-25.0	/////////		C	LOST SAMPLE-POSSIBLE SOFT, WET, CLAY BASED ON LEFTOVERS IN SAMPLER	
	/////////		C		
	/////////		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6917.6
TOTAL DEPTH: 36.5
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 19.0 @ 27 HRS
BORING ID: 0648
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.5-25.0	////////		C	LOST SAMPLE-POSSOBLE SOFT, WET, CLAY BASED ON LEFTOVERS IN SAMPLER	PID-0ppm ALL SAMPLES
	////////		C		
	////////		C		
25.0	////////	25	C		
25.0-28.0	////////		C	CLAY, WET, SOFT, RED BROWN	
	////////		C		
	////////		C		
	////////		C		
	////////		C		
28.0	////////		C		
28.0-30.0	*0*SS*0*0		C	SAND & GRAVEL, 4" SANDSTONE, CHERT, WATER BEARING, HYDROCARBON ODOR, LOOSE, MULTICOLORED	
	*0*SS*0*0		C		
	*0*SS*0*0		C		
30.0	*0*SS*0*0	30	C		
30.0-32.0	S=S=S=S=S		C	CHINLE FORMATION	
	S=S=S=S=S		C	SAMPLER REFUSAL-POSSIBLE "SWEET" ODOR, SANDSTONE & SHALE > 30'; NO ODOR, DRILL	
	S=S=S=S=S		C	WITHOUT SAMPLER TO 35', MATRIX > 30' GREYGREEN, CEMENTED VERY DENSE ROCK @ 32'	
32.0	S=S=S=S=S		C	DIVE SAMPLER 3"-STUCK IN ROCK	
32.0-36.5	S=S=S=S=S		C	SANDSTONE & SHALE, HARD, CALCARIOUS CEMENTATION, FINE TO COARSE, SHALE, GREEN-RED B	
	S=S=S=S=S		C		
	S=S=S=S=S		C		
	S=S=S=S=S		C		
	S=S=S=S=S		C		
	S=S=S=S=S	35	C		
	S=S=S=S=S		C		
	S=S=S=S=S		C		
36.5	S=S=S=S=S		C		
TOTAL DEPTH				NOTE: HYDROCARBON ODOR APPEARS TO BE CONCETRATED IN WATER LYING ON CHINLE FORMATION	
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.4
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 20.0
BORING ID: 0649
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-3.1	///--//// ///--//// ///--//// ///--//// ///--//// ///--////		C C C C C C	CLAY, DAMP, MOIST, RED BROWN, STIFF, SLIGHTLY SILTY, ROOT MATTER	PID-0ppm ALL SAMPLES
3.1					
3.1-4.0	***///*** ***///*** ***///***		C C C	SAND, CLAYEY, RED BROWN, MODERATELY DENSE, DRY-DAMP	
4.0					
4.0-5.0	///---///	5.0	C	CLAY, MOIST, RED BROWN, STIFF, SILTY, ROOT MATTER	
5.0-6.0	***///*** ***///***		C C	SAND, CLAYEY, RED BROWN, SOME COARSE, MODERATELY DENSE, DAMP	
6.0					
6.0-6.9	///***/// ///***///		C C	CLAY, SANDY, RED BROWN, VERY STIFF, MOIST	
6.9					
6.9-8.5	///--*/// ///--*/// ///--*///		C C C	CLAY, SLIGHTLY SILTY, WEAKLY SANDY, SOME CHARCOAL, SOME ROOT MATTER, RED BROWN, STIFF	
8.5					
8.5-8.9	*********		C	SAND, MEDIUM, RED BROWN, MODERATELY DENSE, DAMP	
8.9-17.0	///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**//// ///**////	10 15	C C C C C C C C C C C C C C C C C C	CLAY, SLIGHTLY SANDY, RED BROWN, VERY STIFF, MOIST, SOME SCATTERED GRAVEL	
17.0					
17.0-17.3	***//****		C	SAND, RED BROWN, FINE, MOIST, SLIGHTLY CLAYEY, LOOSE	
17.3-23.2	///00//// ///00//// ///00//// ///00//// ///00//// ///00//// ///00//// ///00//// ///00//// ///00//// ///00//// ///00////	20	C C C C C C C C C C C C	CLAY, WET, RED BROWN, STIFF, SCATTERED FINE GRAVEL (RARE), SOME WHITE FILIMENTS OF CALCIUM CARBONATE SALTS	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.4
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 20.0
BORING ID: 0649
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
23.2-25.0	000***/00 000***/00 000***/00		C C C	**GRAVEL**, SANDY, CHERT, SANDSTONE, SLIGHTLY CLAYEY, RED BROWN, DENSE, **WATER BEARING**	PID-0ppm ALL SAMPLES
25.0	000***/00	25	C		
25.0-30.0	===***=== ===***=== ===***=== ===***=== ===***=== ===***=== ===***=== ===***=== ===***=== ===***===		C C C C C C C C C C	**CHINLE FORMATION** **SHALE**, SANDY, RED BROWN/GREEN INTERBEDS, DENSE, MOIST, NOT WATER BEARING	
30.0	===***===	30	C		
TOTAL DEPTH		35			
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #:	97 032
ELEVATION:	6901.38
TOTAL DEPTH:	30 '
LOGGED BY:	WHK
DATE:	3-23-97
STATIC WATER:	NOT FOUND
BORING ID:	MP-4
PAGE:	1

DEPTH	PID	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-17.1			C	CLAY, SOFT IN UPPER 2 FEET THEN STIFF, WET, RED BROWN, SOME ROOT MATTER AND	ALL SAMPLES
			C	SLICKENSIDED JOINTING	0
		5.0	C		
		10	C	HARD GREATER THAN 10.0'	
		15	C		
17.1			C		
17.1-18.5			C	SILT, GREY BROWN, MODERATELY DENSE, CLAYEY, LAMINATED, DAMP	
18.5			C		
18.5-21.5			C	SAND, CLAYEY, MOIST, MODERATELY DENSE, LIGHT RED BROWN, (Qe)	
		20	C	MORE CLAY GREATER THAN 20.0 FEET	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #	97-032
ELEVATION	6901.38
TOTAL DEPTH	30.0'
LOGGED BY	WHK
DATE:	3-23-97
STATIC WATER:	NOT FOUND
BORING ID	MP-4
PAGE:	2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.2	///oo////		C	CLAY, GREY, SOME PEBBLES, MOIST-WET, VERY STIFF	ALL SAMPLES
23.2-30.0	===***===		C	CHINLE FORMATION	0
	===***===		C	SHALE, SANDY, FISSLE, RED AND GREY WHERE SANDIER, HARD, MOSTLY RED SHALE, DAMP-DRY	
	===***===	25	C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
30.0	===***===	30	C		
TOTAL DEPTH					
		35			
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

Sheet: 1 of 2

PRECISION ENGINEERING, INC.

File #: 96-054

Bore Point: TWO

LOG OF TEST BORINGS

Site: CINIZA REFINERY
GALLUP, NM

Water Elev: 25.2'

Elevation: 6916.0

Boring No.: MP-9

Date: 4-3-96

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	%M	L	PI	CLASS.
	0.0-17.3		///		C	CLAY, DARK RED BROWN, HARD, MOIST, SLIGHTLY SILTY				
			///		C					
			///		C					
			///		C					
			///	2.5	C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	5.0	C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	7.5	C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	10	C					
			///		C	SLIGHTLY SANDY @ 10.0'				
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	15	C					
			///		C					
			///		C					
			///		C					
			///		C					
	17.3-20.2		///////		C	CLAY, DARK RED BROWN, FIRM, WET (NOT WATER BEARING), SOME PEBBLES TO ~ 1" PRESENT, PEBBLES ARE MAINLY SANDSTONE				
			///////		C					
			///////		C					
			///////		C					
			///////		C					
			///////	20	C					
			///////		C					
	20.2-21.8		//+++/		C	CLAY, VERY SANDY, WET/SATURATED, SOME FREE WATER ON SAMPLE, VERY WEAK THOUGH SOFT, BROWN				
			//+++/		C					
			//+++/		C					
	21.8-22.5		++++++		C	SAND, SOFT, VERY CLAYEY, SOME FREE WATER, (WEAK), BROWN				
			++++++		C					

Size & Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHK

Sheet: 2 OF 2

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

File #: 96-054

Bore Point: TWO

Site: CINIZA REFINERY GALLUP, NM

Water Elev: 25.2'

Elevation: 6916.0

Boring No.: MP-9

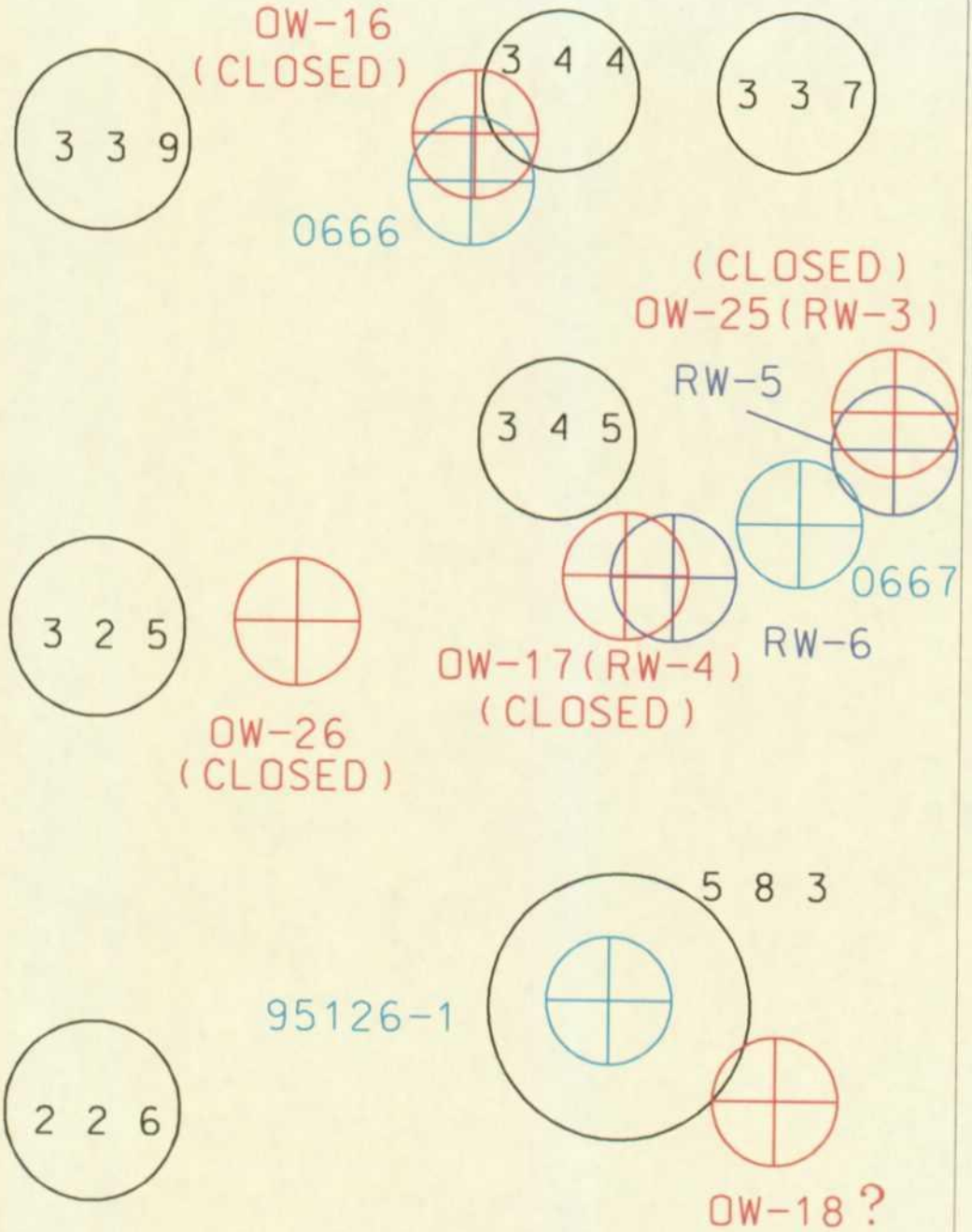
Date: 4-3-96

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	%M	L	PI	CLASS
	22.5-25.2		///**/ ///**/ ///**/ ///**/	25	C C C C	CLAY, BROWN, FIRM, WET (NOT WATER BEARING), WHITE FILIMENTS, CALCAREOUS OR SULFATE, SOME VERY THIN SANDS THAT ARE NOT WATER BEARING				
	25.2-25.8		****** ******		C C	SAND, FINE, WATER BEARING, BROWN, SOFT				
	25.8-26.7		//////		C	CLAY, WET, FIRM, BROWN				
	26.7-28.3		****** ****** ******		C C C	SAND, FINE TO MEDIUM, WATER BEARING, (POOR), LOOSE TO MEDIUM DENSE, BROWN				
	28.3-30.0		////// ////// ////// //////	30	C C C C	CLAY, BROWN, FIRM, WET, (NOT WATER BEARING)				
	30.0-30.9		***//* ***//*		C C	SAND, FINE, MEDIUM, CLAYEY, BROWN, WATER BEARING				
	30.9-31.2		000000 000000		C C	GRAVEL, TO 4", WATER BEARING, BROWN, DENSE, MAINLY SANDSTONE GRAVEL				
	31.2-33.3		SSS**S SSS**S SSS**S		C C C	CHINLE FORMATION SHALE, GREEN BROWN, SANDY, SOME RED BROWN PARTINGS, WET, DENSE				
	TD			35 40 45	C C C C C C C C C C C C C C C C C C C C C C C C C					

Size & Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHK

OW-17(RW-4) Vicinity Map



PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6938.2
TOTAL DEPTH: 20.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0666
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-2.5	///***///		C	CLAY, SANDY, MOIST, SOFT, LIGHT RED BROWN	0.0-13.2
	///***///		C		NO ODOR
	///***///		C		
	///***///		C		
	///***///		C		
2.5					
2.5-3.8	****--***		C	SAND, FINE, SILTY, NO PLASTICITY, MOIST, LOOSE, RED BROWN	
	****--***		C		
3.8	****--***		C		
3.8-6.3	*********		C	SAND, MEDIUM, MULTICOLORED RED BROWN, LOOSE, MOIST	
	*********	5.0	C		
	*********		C		
	*********		C		
6.3	*********		C		
6.3-6.9	///--**//		C	CLAY, SILTY, SANDY, RED BROWN, FIRM, WET	
6.9-8.0	****oo***		C	SAND, COARSE, GRAVELLY, LOOSE, MOIST, RED BROWN	
8.0	****oo***		C		
8.0-9.6	/////////		C	CLAY, STIFF, CARBONATE FILAMENTS AS CRACK FILLING, RED BROWN, WET	
	/////////		C		
9.6	/////////		C		
9.6-10.0	****oo***	10	C	SAND, COARSE, GRAVELLY, RED BROWN, MOIST, LOOSE, MEDIUM DENSE	
10.0-13.2	////**///		C	CLAY, FINE, SANDY, RED BROWN, SOFT, WET	
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
13.2	////**///		C		
13.2-13.4	*********		C	SAND, FINE, RED BROWN, LOOSE, MOIST	13.2-14.8
13.4-14.3	////**///		C	CLAY, FINE, SANDY, RED BROWN, SOFT, WET	WEAK ODOR
14.3	////**///		C		
14.3-14.6	*********	15	C	SAND, FINE, RED BROWN, MOIST, LOOSE	14.8-20.0
14.6-14.8	///***///		C	CLAY, SANDY, BROWN, WET, NOT WATER BEARING, SOFT	NO ODOR
14.8-15.4	/////////		C	CLAY, RED BROWN, WET, STIFF, (POSSIBLE WEATHERED SHALE)	
15.4-20.0	=========		C	CHINLE FORMATION	
	=========		C	SHALE, RED, DAMP TO DRY, FISSLE, HARD, CRUMBLY	
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
20.0	=========	20	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6938.6
TOTAL DEPTH: 35.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0667
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-2.0 2.0	///**--// ///**--// ///**--// ///**--//		C C C C	CLAY, FINE, SANDY, SILTY, WET, BROWN	0.0-29.5 NO ODOR
2.0-4.2 4.2	***ooo*** ***ooo*** ***ooo*** ***ooo***		C C C C	SAND, GRAVELLY, FINE, BROWN, MOIST, LOOSE	
4.2-5.0 5.0	///***/// ///***///	5.0	C C	CLAY, SANDY, SOME CARBONATE NODULES AND FILAMENTS, STIFF, MOIST TO WET, BROWN	
5.0-7.8 7.8	********* ********* ********* ********* ********* *********		C C C C C C	SAND, FINE TO MEDIUM, BROWN, MOIST TO DAMP, LOOSE	
7.8-9.0 9.0	///--**// ///--**//		C C	CLAY, SILTY, FINE, SANDY, MOIST TO WET, BROWN, STIFF	
9.0-9.2	ooo***ooo		C	GRAVEL, SANDY, BROWN, DAMP, LOOSE	
9.2-12.0 12.0	////**/// ////**/// ////**/// ////**/// ////**///	10	C C C C C	CLAY, VERY FINE, SANDY, MOIST TO WET, SOFT, RED BROWN	
12.0-14.5 14.5	///---/// ///---/// ///---/// ///---/// ///---///		C C C C C	CLAY, SILTY, WET, BROWN, SOFT	
14.5-18.1 18.1	********* ********* ********* ********* ********* ********* *********	15	C C C C C C C	SAND, VERY FINE, BROWN, MODERATELY DENSE, MOIST	
18.1-19.0 19.0	///***/// ///***///		C C	CLAY, SANDY, SOFT, BROWN, WET	
19.0-20.4 20.4	***ooo*** ***ooo*** ***ooo***	20	C C C	SAND, GRAVELLY, BROWN-MULTICOLOR, DENSE, MOIST	
20.4-23.0	////**/// ////**/// ////**/// ////**/// ////**///		C C C C C	CLAY, SLIGHTLY VERY FINE, SANDY, SOFT, RED BROWN, WET, WATER ON SURFACE OF SAMPLE 22.8'-23.0', DOES NOT APPEAR WATER BEARING	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6938.6
TOTAL DEPTH: 35.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0667
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.0-29.5			C	CLAY, SANDY, LAMINAR, STIFF, WET, RED BROWN, GRADES SANDIER FURTHER DOWN	0.0-29.5 NO ODOR
29.5		25	C		
29.5-32.8		30	C	SAND, COARSE, DARK GREY, MOIST, MEDIUM DENSE, WATER BEARING, VERY GRAVELLY AT 31.0' FREE HYDROCARBON AND WATER ON TOP OF SHALE	WEAK HYDROCARBON ODOR
32.8			C		STRONG
32.8-35.0			C	CHINLE FORMATION SHALE, HARD, DRY TO DAMP, RED BROWN, CRUMBLY (WITH DIFFICULTY), REDUCTION SPOTS	NO ODOR
35.0		35	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6942.5
TOTAL DEPTH: 40.0 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.0 FEET
BORING ID: RW-5
PAGE: 1 OF 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (PPM)
0.0-3.8	***-/-***		C	SAND, SILTY, CLAYEY, SOME PEBBLES, WET, NO ODOR, RED-BROWN, FILL LOOSE	
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
3.8	***-/-***		C		
3.8-8.9	***///***		C	SAND, CLAYEY, WET, DENSE, RED-BROWN, SOME FINE GRAVEL	
	///	5.0	C		
	///		C		
	///		C		
	///		C		
	///		C		
	///		C		
	///		C		
8.5	***///***		C		
8.5-8.9	//////////		C	CLAY, WET, STIFF, RED-BROWN	
8.9-9.7	///***///		C	CLAY, VERY FINE SANDY, STIFF, RED-BROWN, WET, LAMINAR BANDING	
9.7-9.8	**********	10	C	SAND, FINE, WHITE, MOIST, LOOSE	
9.8-10.0	///***///		C	CLAY, VERY FINE SANDY, STIFF, RED-BROWN, WET, LAMINAR BANDING	
10.0-13.8	//////////		C	CLAY, SOFT, BROWN TO RED-BROWN, FINE, BLOCKY, VERY WET, LAMINAR BANDING	
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
13.8	//////////		C		
13.8-14.5	///***///		C	CLAY, VERY FINE SANDY, RED-BROWN, MODERATELY DENSE, WET/MOIST	
14.5-14.6	**********	15	C	SAND, VERY FINE, MOIST, LOOSE, WHITE TO LIGHT BROWN, LAMINAR BANDING	
14.6-16.5	////**///		C	CLAY, WET, SOFT, SLIGHTLY FINE SANDY, NO STRUCTURE	
	////**///		C		
16.5	////**///		C		
16.5-18.0	***-/-***		C	SAND, SILTY, CLAYEY, LAMINAR BANDING, MEDIUM DENSE, MOIST	
	-/-		C		
18.0	***-/-***		C		
18.0-20.0	***//oo**		C	SAND, CLAYEY, GRAVELLY, VERY DENSE, MOIST, VERY COMPACT, MEDIUM SAND, RED-BROWN,	
	***//oo**		C	SOME 1-2" GRAVEL	
	***//oo**		C		
20.0	***//oo**	20	C		
20.0-21.5	///--*///		C	CLAY, VERY SILTY, SANDY (VERY FINE), WET, SOFT, SLIGHTLYBLOCKY, BROWN	
	///--*///		C		
21.5	///--*///		C		
21.5-22.9	///***///		C	CLAY, VERY FINE, SANDY, WET, SHOWS FREE WATER IF WORKED, LAMINAR BANDING	
	///***///		C		
22.9	///***///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PRECISION ENGINEERING, INC.

PROJECT: CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6942.5
TOTAL DEPTH: 40.0 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.0 FEET
BORING ID: BW-5
PAGE: 2 OF 3

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
22.9-24.1	///▪▪////		C	CLAY, VERY FINE, SANDY, AS ABOVE BUT LESS MOISTURE	
24.1	///▪▪////		C		
24.1-25.0	000//▪000		C	GRAVEL, CLAYEY, WET/MOIST, SOME GREATER THAN 3" SANDSTONE PIECES	
25.0	000//▪000	25	C		
25.0-28.0	////▪////		C	CLAY, SLIGHTLY FINE SANDY, WET, LAMINAR BANDING, BROWN TO RED-BROWN, STIFF	
	////▪////		C		
	////▪////		C		
	////▪////		C		
	////▪////		C		
28.0	////▪////		C		
28.0-28.6	▪▪▪▪▪▪▪▪▪▪		C	SAND, FINE, DENSE, MOIST, VERY STRONG HYDROCARBON ODOR, LIGHT BROWN, SOME PEBBLES	
28.6-30.0	▪▪▪SHSH▪▪		C	SANDSTONE, SHALEY, HYDROCARBON ODOR, HARD, FRACTURED, LIGHT GREEN TO WHITE,	
	▪▪▪SHSH▪▪		C	ARGILLACEOUS	
30.0	▪▪▪SHSH▪▪	30	C		
30.0-31.0	▪▪▪SHSH▪▪		C	SANDSTONE AND SHALE PIECES, HYDROCARBON ODOR, HARD, WHITE/GREEN MOTTLED	
31.0	▪▪▪SHSH▪▪		C		
31.0-34.0	OOOOOOOOO		C	GRAVEL, FINE, VERY WET, WATER BEARING, DENSE	
	OOOOOOOOO		C		
	OOOOOOOOO		C		
	OOOOOOOOO		C		
	OOOOOOOOO		C		
34.0	OOOOOOOOO		C		
34.0-40.0	SHSH▪▪SHS		C	SHALE, SANDY, HARD, FISSLE, GREY/RED, DRY, NO ODOR	
	SHSH▪▪SHS	35	C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
40.0	SHSH▪▪SHS	40	C		
TD					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PRECISION ENGINEERING, INC.

PROJECT: Cinizs Refinery

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6972.6
TOTAL DEPTH: 38.5 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.5 FEET
BORING ID: RW-6
PAGE: 1 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0-5.0	/oo/o/oo/		C	Gravel, fine, clayey, moderatly dense, moist, red-brown, some pieces to 2".	
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
5.0	/oo/o/oo/	5.0	C		
5.0-8.0	//-*-*///		C	Clay, silty, very fine sand, red-brown, soft, wet, laminar banding.	
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
8.0	//-*-*///	8.0	C		
8.0-9.0	**********		C	Sand, fine, red-brown, moist, loose.	
9.0	**********		C		
9.0-12.5	**********		C	Sand, fine, red-brown, laminar banding, moist, some medium, mostly fine, medium	
	**********	10	C	dense.	
	**********		C		
	**********		C		
	**********		C		
	**********	12	C		
12.5	**********		C		
12.5-13.5	//////////		C	Clay, wet, brown, laminar banding, fine blocky blocky, soft.	
13.5	//////////		C		
13.5-15.0	/***/***/		C	Sand, fine, clayey, moist, medium dense, red-brown, laminar banding.	
	/***/***/		C		
15.0	/***/***/	15	C		
15.0-17.0	//////////		C	Clay, very fine sandy, silty, wet, soft, red-brown, laminated.	
	//////////		C		
	//////////		C		
17.0	//////////		C		
17.0-17.4	**********		C	Sand, medium, loose, light brown, moist.	
17.4-23.0	//-*-*///		C	Clay, very fine sandy, silty, wet, soft, red-brown, laminated, some	
	//-*-*///		C	thin cleaner sand.	
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///	20	C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PRECISION ENGINEERING, INC.

PROJECT: Cinizza Refinery

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6972.6
TOTAL DEPTH: 38.5 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.5 FEET
BORING ID: MW-6
PAGE: 2 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
17.4-23.0	//-*-*///		C	Clay, very fine sandy, silty, wet, soft, red-brown, laminated, some thin cleaner sand.	
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
23.0	//-*-*///		C		
23.0-23.5	**/***/**		C	Sand, coarse, clayey, dense, red-brown, moist.	
23.5-31.5	**/*//*/*		C	Sand, clayey, fine, wet, red-brown, laminar banding, moderately dense.	
	**/*//*/*		C		
	**/*//*/*	25	C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*	30	C		
	**/*//*/*		C		
	**/*//*/*		C		
31.5	**/*//*/*		C		
31.5-33.5	**O**O***		C	Sand, gravelly, strong hydrocarbon odor, water bearing, grey-brown, dense.	
	OO***		C		
	OO***		C		
33.5	**O**O***		C		
33.5-38.5	ShShShSh		C	Shale, green-grey, sandy, hard, dry, no odor.	
	ShShShSh		C		
	ShShShSh	35	C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
T.D. 38.5			C		
			C		
		40	C		
			C		
			C		
			C		
			C		
			C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-16

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3797.65, W1373.78
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7674
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 25, 1998
REASON FOR CLOSURE:	POTENTIAL FOR AQUIFER CONTAMINATION

DETAIL OF CLOSURE PROCEDURE:

1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 22 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 38 CU FT
MAX INJECTION PRESSURE: 600 PSI

BORING OW-16

SURFACE ELEVATION: 6942 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

LABORATORY TEST DATA

PENETRATION RATE MINUTES/FOOT

	SYMBOLS	DESCRIPTION
2.5	SM	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL, SOFT, HIGHLY WEATHERED
2.5		
5.0		
6.7	SS	12 FEET: SANDSTONE, RED, FINE-GRAINED, HARD, FRESH
5.0	SHALE	15 FEET: SHALE, RED, SANDY, HARD, FRESH
5.0		
5.0		
5.0		
5.0		
10.0	SS	47 FEET: SANDSTONE, GRAY, FINE-TO MEDIUM-GRAINED, CALCAREOUS, HARD, FRESH
4.3	SHALE	50 FEET: SHALE, GRAY, SILTY, WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 54.6 FEET ON 12/2/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 44.6 TO 54.6 FEET.
GRAVEL PLACED FROM 36.0 TO 54.6 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 26.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

DAMES & MOORE

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-17

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3855.99, W1209.40
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7674
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 25, 1998
REASON FOR CLOSURE:	POTENTIAL FOR CROSS CONTAMINATION/ WELL REPLACED

DETAIL OF CLOSURE PROCEDURE:

1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 29 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 43 CU FT
MAX INJECTION PRESSURE: 525 PSI

BORING OW-17

SURFACE ELEVATION: 6941 FEET

DEPTH IN FEET	LABORATORY TEST DATA: TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

PENETRATION RATE MINUTES/FOOT	SYMBOLS	DESCRIPTION
3.0 3.2	SM	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE AND SANDSTONE, SOFT, HIGHLY WEATHERED
6.0	SS	11 FEET: SANDSTONE, REDDISH BROWN, FINE-GRAINED, NONCALCAREOUS, HARD, FRESH
2.9 5.6 2.8 3.8 3.2 3.3	SHALE	13 FEET: SHALE, REDDISH BROWN, SANDY, SOFT, FRESH GRADES HARD FROM 27.5 TO 30.0 FEET GRADES GRAY FROM 31 FEET GRADES WITH THIN LIMESTONE AND SANDSTONE INTERBEDS FROM 39 FEET
4.3	SS	40 FEET: SANDSTONE, GRAY, FINE-GRAINED, SILTY, CALCAREOUS, HARD, FRESH
5.0 4.3 5.0	SHALE	42 FEET: SHALE, GRAY, SILTY, SANDY, WITH SOME GRAVEL-SIZED FRAGMENTS OF CHERT AND LIMESTONE AND OCCASIONAL THIN INTERBEDS OF LIMESTONE, HARD, FRESH

BORING COMPLETED AT 50.0 FEET ON 1/3/81.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 38.0 TO 50.0 FEET.
GRAVEL PLACED FROM 24.0 TO 50.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 31.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-25

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3960.15, W1270.80
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7677
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 24, 1998
REASON FOR CLOSURE:	POTENTIAL FOR CROSS CONTAMINATION/ WELL REPLACED

DETAIL OF CLOSURE PROCEDURE:

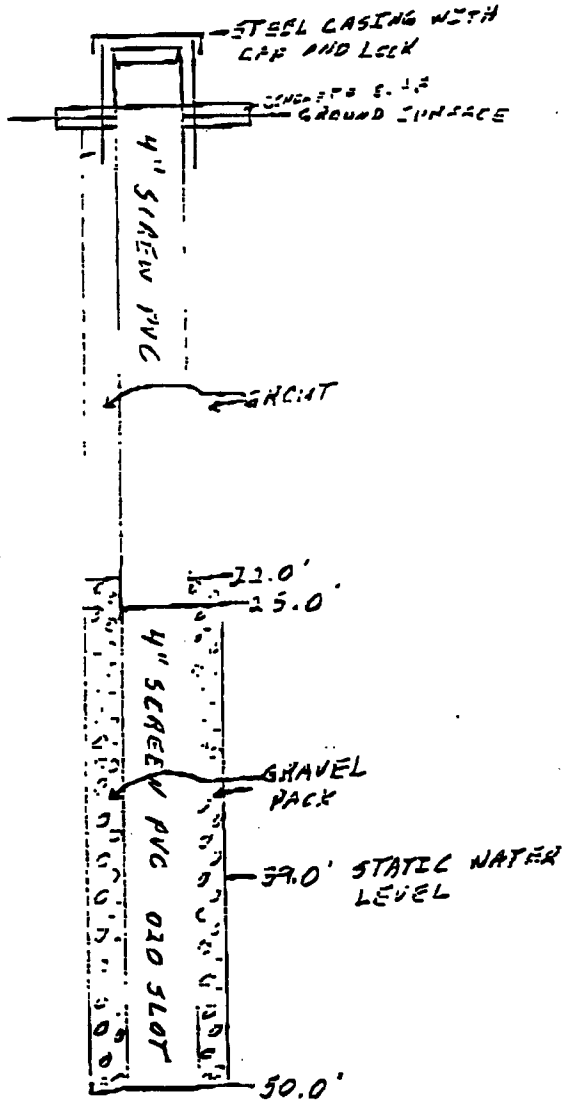
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 27 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 40 CU FT
MAX INJECTION PRESSURE: 500 PSI

CINIZA REFINERY

OW-25

DRILLED: JUNE 28, 1990



FORMATION LOG

Depth (ft.)	Formations
0-7	Clay
7-25	Red sandy clay
25-39	Clay with sand layers
39-50	Sand with thin clay layers

DRILLER NOT KNOWN

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-26

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3730.74, W1188.93
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7674
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 26, 1998
REASON FOR CLOSURE:	POTENTIAL FOR AQUIFER CONTAMINATION

DETAIL OF CLOSURE PROCEDURE:

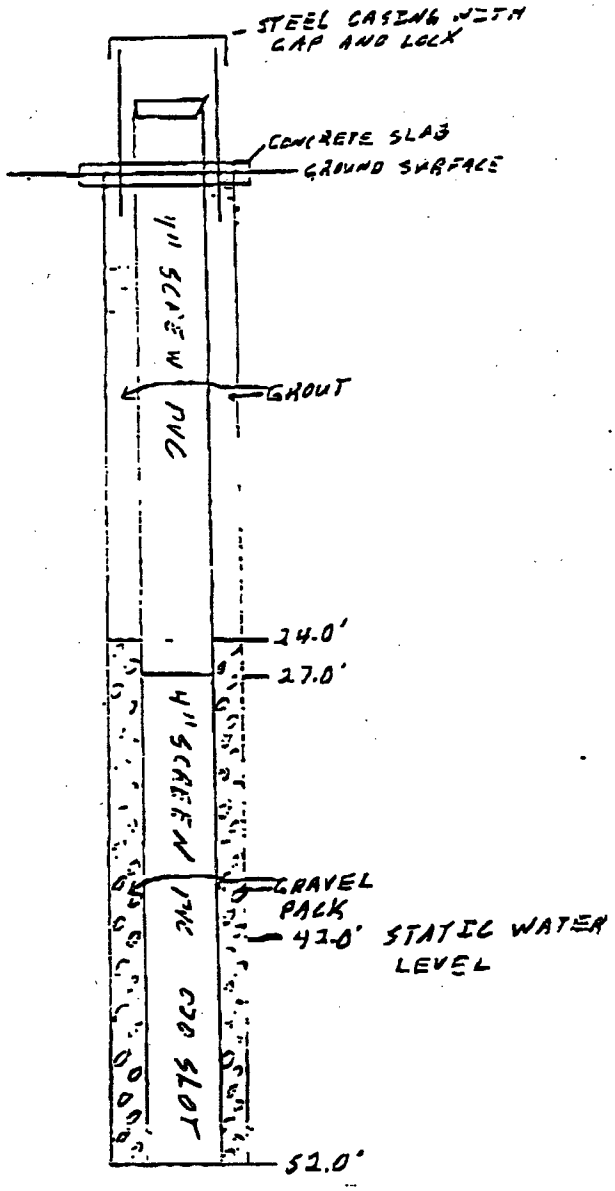
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 22 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 35 CU FT
MAX INJECTION PRESSURE: 575 PSI

CINIZA REFINERY

OW-26

DRILLED: JUNE 29, 1990



FORMATION LOG

Depth (Ft)	Formation
0-5	Clay
5-19	Red sandy clay
19-42	Red clay with sand layers
42-52	Sand with thin clay layers

CASING DRILLER NOT KNOWN

GIANT
REFINING COMPANY

Via Certified Mail

December 20, 2002

Mr. Wayne Price
State of New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Ciniza Refinery, Giant Refining Co.
Groundwater Discharge Permit Renewal (GW-32)

Dear Mr. Price:

Enclosed you will find the following documents:

- Letter from Bill Kingsley detailing the activities near Tanks 337, 344, and 345
- Boring and Closure Records for wells OW-16, OW-17, OW-25, and OW-26
- Boring Logs and Well Diagrams for Recovery Wells RW-5 and RW-6
- Boring Logs and Well Diagrams for OW-27 (Recovery Well RW-1)
- Boring Logs and Well Diagrams for OW-28 (Recovery Well RW-2)
- A copy of the map from the 2001 Comprehensive GW sampling report showing the addition of the location of OW-17
- A map of the Tank Farm and approximate locations of wells.
- Boring Log, Closure Report, and boring logs of potential replacement wells for OW-20; OW-20 was not replaced because no water or contamination was found in the area. A copy of the well closure procedure is also enclosed.

If you have any questions or comments regarding this report, please call me at 505.722.0227. Thank you for assistance with our permit renewal.

Sincerely,

Dorinda Mancini

Dorinda Mancini, Environmental Manager
Ciniza Refinery, Giant Refining Co.

ENC

Cc: Ed Riege, Environmental Superintendent, Giant Industries, Inc. (w/o enclosures)

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

PRECISION ENGINEERING, INC.
P.O. BOX 422 • LAS CRUCES, NM 88004
PH: (505) 523-7674
FAX 505-523-7248 • e-mail: werpei@aol.com

September 31, 1997

Ms. Dorinda Mancini
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Re: August 23 – 29 Activities

Dear Dorinda,

This letter summarizes our activities within the tank farm inside the containment berm surrounding Tanks 337, 345 and 344. The purpose of the work was to evaluate whether or not product discovered in OW-17(RW-4) and OW-25(RW-3) was associated with a gravelly zone lying directly on top of the Chinle formation or from a sandstone stringer, likely associated with the upper portion of the Sonsela Sandstone bed within the Chinle Formation.

It is known that OW-17(RW-4), OW-25(RW-3), OW-16, and OW26 are screened in the sandstone stringer, most likely representing the upper portion of the Sonsela Sandstone. Wells OW-17(RW-4) and OW-25(RW-3) also have gravel packs that extend into the gravelly zone that lies on top of the Chinle; OW-16 and OW-26 do not. At the time of the investigation both OW-17(RW-4) and OW-25(RW-3) had substantial free product accumulation (approximately 20 inches); OW-16 and OW-26 had no physical evidence of contamination. It was therefore suspected that the contamination was coming from the upper gravelly layer that lies directly on top of the Chinle Shale.

The free product was pumped from OW-17(RW-4) and OW-25(RW-3). The level was monitored in the casing and approximately one eighth (⅛) inch of free product was observed after 24 hours. It was decided that the one eighth (⅛) inch of free product could have come from drip-down inside the casing. It was also decided with the high initial level of free product it was likely that greater than one eighth (⅛) inch should accumulate after a 24 hour period. It was decided to advance two additional borings offset from each of OW-17(RW-4) and OW-25(RW-3) that would be drilled to the top of the Chinle Shale to penetrate the gravelly zone alone.

The borings were advanced. Within one hour of completion of each boring approximately twenty (20) inches of free product was observed in each boring. The borings were then converted to wells and named RW-5, which is offset 10' east of OW-25(RW-3) and RW-6 which is offset north of OW-17(RW-4). These wells were subsequently setup as recovery wells using air driven downhole bladder pumps.

Screen records of the OW-17(RW-4) and OW-25(RW-3) show screen below the Alluvium/Chinle interface. When the wells were used for product recovery the water level was drawn

below the top of the screen and the product was introduced into the interior of the casing where it was pumped out. The only reason the Sonsela remained unaffected in the wells was because the artesian properties of the Sonsela Sandstone bed developed excess hydrostatic head keeping the product from intruding into the formation. It is strongly recommended that the wells OW-17(RW-4) and OW-25(RW-3) be permanently closed to seal off the possibility of communication between the formations.

If you have any questions please contact our office.

Sincerely,
Precision Engineering, Inc.

William H. Kingsley, P.E.

BORING OW-16

SURFACE ELEVATION: 6942 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

LABORATORY TEST DATA

PENETRATION RATE MINUTES/FOOT	SYMBOLS	DESCRIPTION
2.5	SM	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL, SOFT, HIGHLY WEATHERED
2.5		
5.0		
6.7	SS	12 FEET: SANDSTONE, RED, FINE-GRAINED, HARD, FRESH
5.0	SHALE	15 FEET: SHALE, RED, SANDY, HARD, FRESH
5.0		
5.0		
5.0		
5.0		
5.0		
10.0	SS	47 FEET: SANDSTONE, GRAY, FINE-TO MEDIUM-GRAINED, CALCAREOUS, HARD, FRESH
4.3	SHALE	50 FEET: SHALE, GRAY, SILTY, WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 54.6 FEET ON 12/2/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 44.6 TO 54.6 FEET.
GRAVEL PLACED FROM 36.0 TO 54.6 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 26.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

DAMES & MOORE

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-16

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3797.65, W1373.78
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 25, 1998
REASON FOR CLOSURE:	POTENTIAL FOR AQUIFER CONTAMINATION

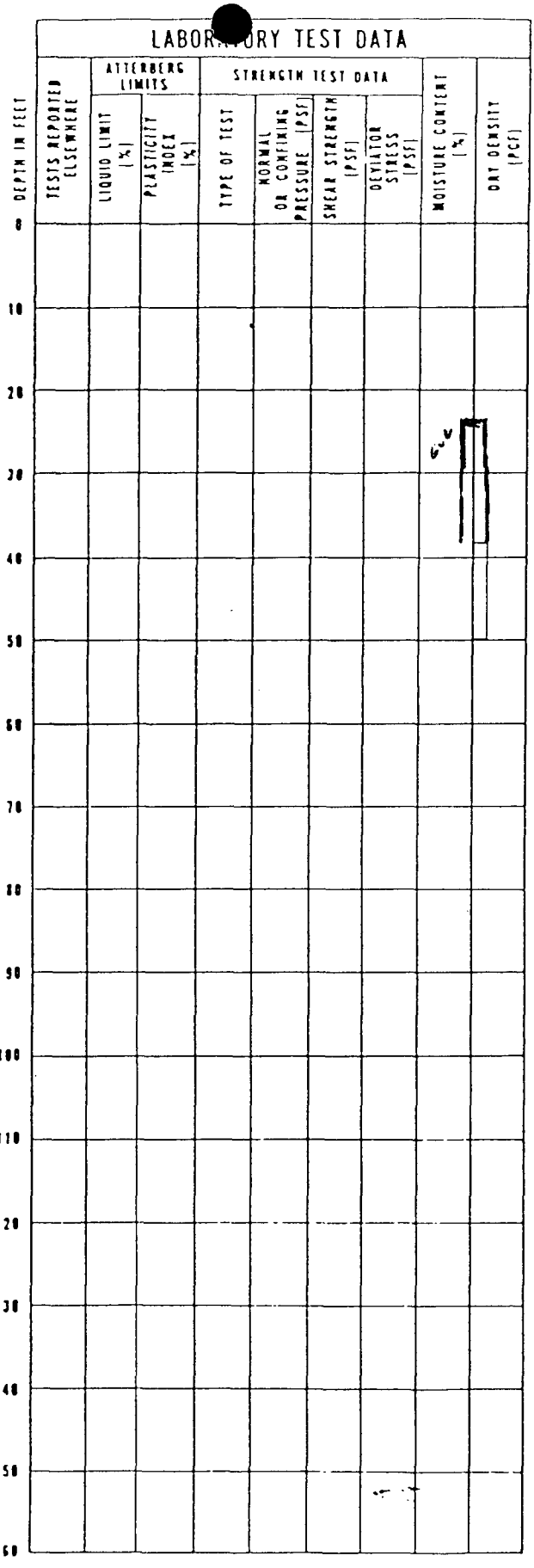
DETAIL OF CLOSURE PROCEDURE:

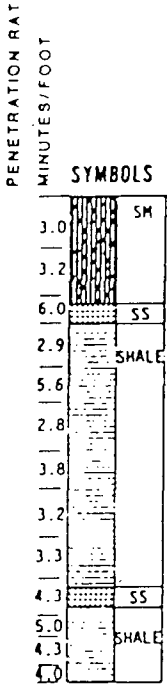
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 22 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 38 CU FT
MAX INJECTION PRESSURE: 600 PSI

BORING OW-17

SURFACE ELEVATION: 6941 FEET





DESCRIPTION

TRIASSIC PERIOD

CHINLE FORMATION

REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE AND SANDSTONE, SOFT, HIGHLY WEATHERED

11 FEET: SANDSTONE, REDDISH BROWN, FINE-GRAINED, NONCALCAREOUS, HARD, FRESH

13 FEET: SHALE, REDDISH BROWN, SANDY, SOFT, FRESH

GRADES HARD FROM 27.5 TO 30.0 FEET

GRADES GRAY FROM 31 FEET

GRADES WITH THIN LIMESTONE AND SANDSTONE INTERBEDS FROM 39 FEET

40 FEET: SANDSTONE, GRAY, FINE-GRAINED, SILTY, CALCAREOUS, HARD, FRESH

42 FEET: SHALE, GRAY, SILTY, SANDY, WITH SOME GRAVEL-SIZED FRAGMENTS OF CHERT AND LIMESTONE AND OCCASIONAL THIN INTERBEDS OF LIMESTONE, HARD, FRESH

BORING COMPLETED AT 50.0 FEET ON 1/3/81.

4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 38.0 TO 50.0 FEET.

GRAVEL PLACED FROM 24.0 TO 50.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.

GROUND WATER LEVEL MEASURED AT 31.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

DAMES & MOORE

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-17

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3855.99, W1209.40
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 25, 1998
REASON FOR CLOSURE:	POTENTIAL FOR CROSS CONTAMINATION/ WELL REPLACED

DETAIL OF CLOSURE PROCEDURE:

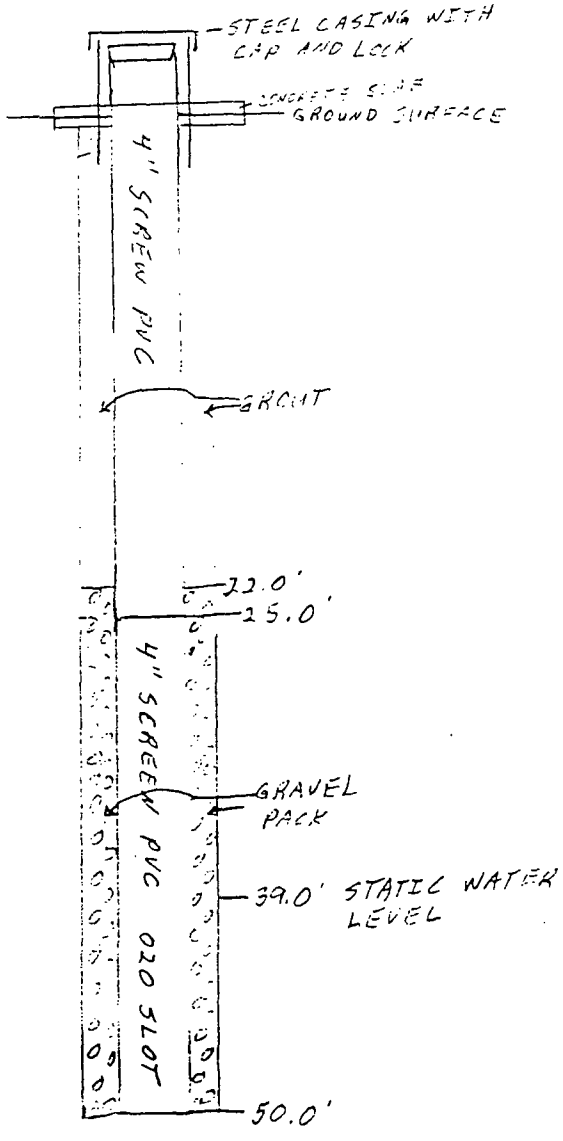
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 29 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 43 CU FT
MAX INJECTION PRESSURE: 525 PSI

CINIZA REFINERY

OW-25

DRILLED: JUNE 29, 1990



FORMATION LOG

Depth (ft)	Formation
0-7	Clay
7-28	Red sandy clay
28-39	Clay with sand layers
39-50	Sand with thin clay layers

DRILLER NOT KNOWN

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-25

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3960.15, W1270.80
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 24, 1998
REASON FOR CLOSURE:	POTENTIAL FOR CROSS CONTAMINATION/ WELL REPLACED

DETAIL OF CLOSURE PROCEDURE:

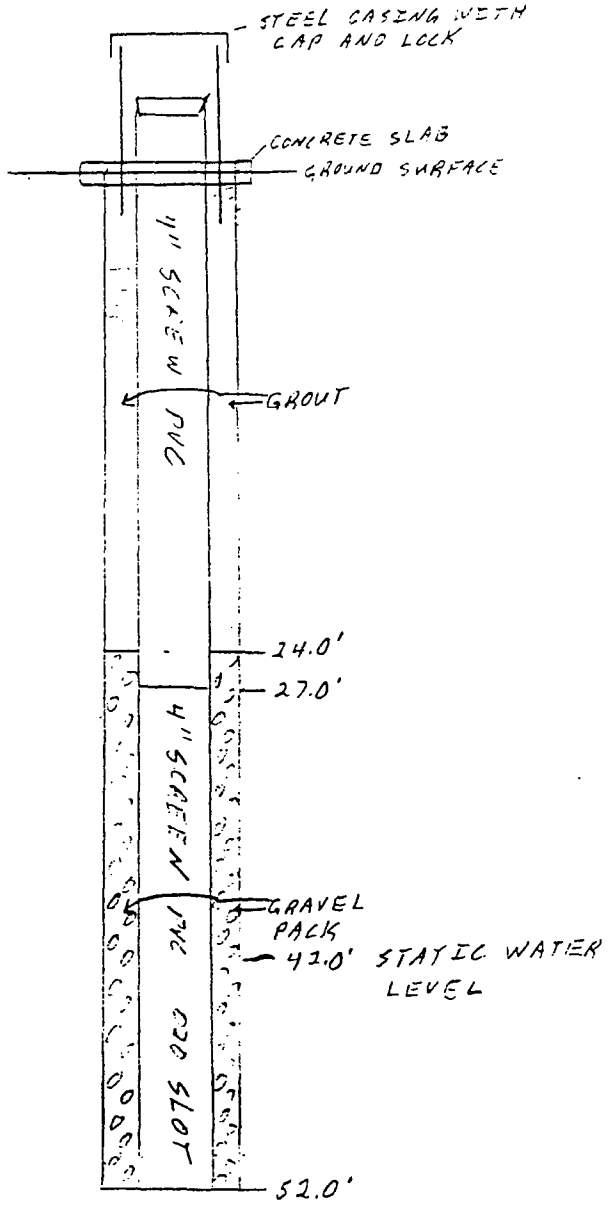
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 27 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 40 CU FT
MAX INJECTION PRESSURE: 500 PSI

CINIZA REFINERY

OW-26

DRILLED: JUNE 29, 1990



FORMATION LOG

Depth (Ft)	Formation
0-5	Clay
5-19	Red sandy clay
19-42	Red clay with sand layers
42-52	Sand with thin clay layers

DRILLER NOT KNOWN

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-26

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3730.74, W1188.93
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 26, 1998
REASON FOR CLOSURE:	POTENTIAL FOR AQUIFER CONTAMINATION

DETAIL OF CLOSURE PROCEDURE:

1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

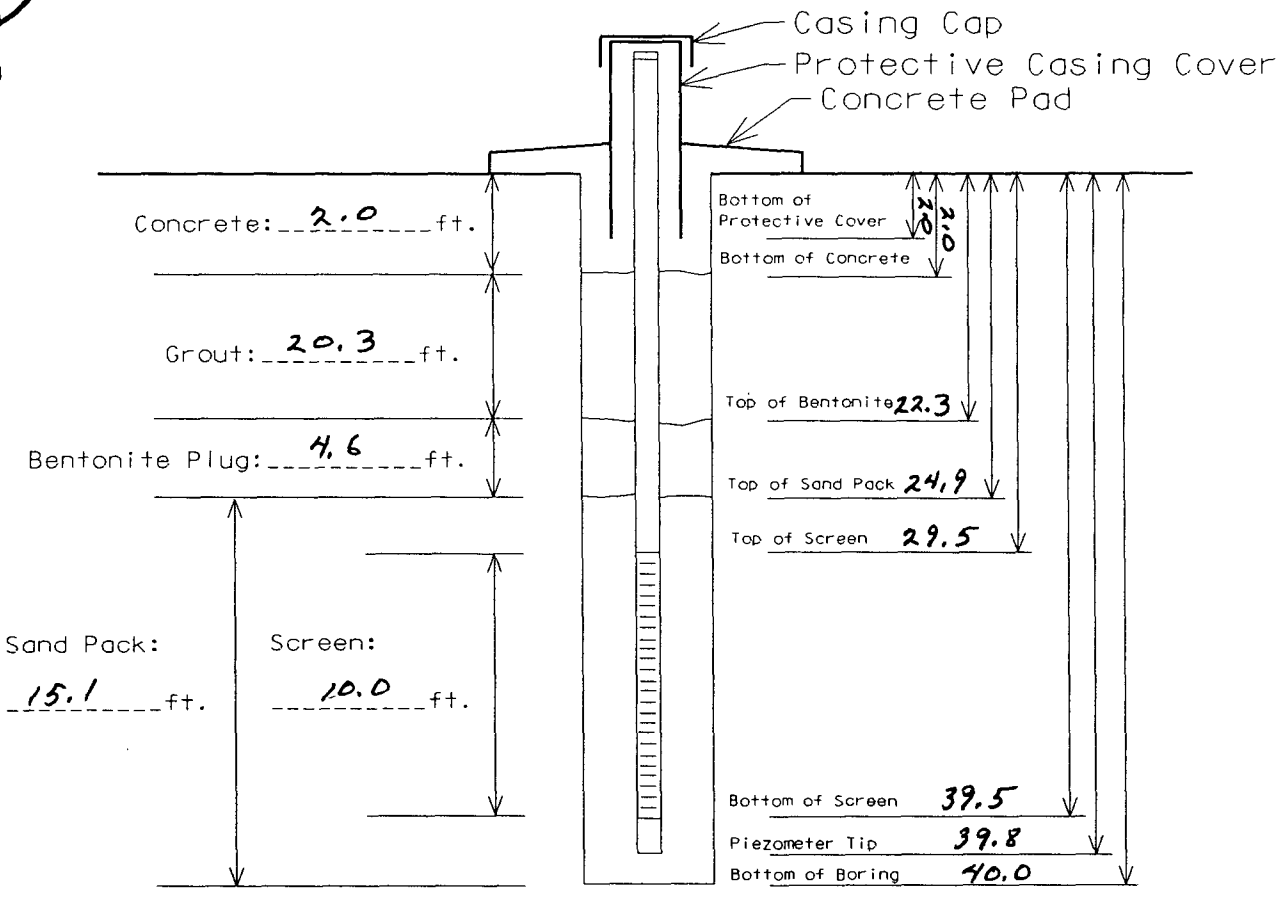
REQUIRED GROUT VOLUME OF THIS WELL: 22 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 35 CU FT
MAX INJECTION PRESSURE: 575 PSI

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. RW-5



Boring Diameter: 9.25"

Sand Type: 20-40

Bollards. Type/Size: 3" STEEL PIPE

Bentonite: 3/8" CHIP

Screen Type/Size: 4" SCH 40 PVC/0.010" MACHINE SLOT

Cement/Grout: 6% BENT./CEMENT

Riser Type/Size: 4" SCH 40 FLUSH JOINT PVC

Water: 30.0

Locking Expandable Casing Plug? YES

Site Northing: 3959.0

Other: PRODUCT 28.2 (8-27-97)

Bottom Cap Used? YES

Site Easting: 12560

Project #: 97-070

Project Name: GIANT REFINING - CINIZA

Elevation: 4942.5 GROUND

PROJECT: CINIZA REFINERY

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6942.5
TOTAL DEPTH: 40.0 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.0 FEET
BORING ID: RW-5
PAGE: 1 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-3.8	***-/-***		C	**SAND**, SILTY, CLAYEY, SOME PEBBLES, WET, NO ODOR, RED-BROWN, FILL LOOSE	
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
3.8	***-/-***		C		
3.8-8.9	***///***		C	**SAND**, CLAYEY, WET, DENSE, RED-BROWN, SOME FINE GRAVEL	
	///	5.0	C		
	///		C		
	///		C		
	///		C		
	///		C		
	///		C		
	///		C		
8.5	***///***		C		
8.5-8.9	/////////		C	**CLAY**, WET, STIFF, RED-BROWN	
8.9-9.7	///***///		C	**CLAY**, VERY FINE SANDY, STIFF, RED-BROWN, WET, LAMINAR BANDING	
9.7-9.8	*********	10	C	**SAND**, FINE, WHITE, MOIST, LOOSE	
9.8-10.0	///***///		C	**CLAY**, VERY FINE SANDY, STIFF, RED-BROWN, WET, LAMINAR BANDING	
10.0-13.8	/////////		C	**CLAY**, SOFT, BROWN TO RED-BROWN, FINE, BLOCKY, VERY WET, LAMINAR BANDING	
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
13.8	/////////		C		
13.8-14.5	///***///		C	**CLAY**, VERY FINE SANDY, RED-BROWN, MODERATELY DENSE, WET/MOIST	
14.5-14.6	*********	15	C	**SAND**, VERY FINE, MOIST, LOOSE, WHITE TO LIGHT BROWN, LAMINAR BANDING	
14.6-16.5	////**///		C	**CLAY**, WET, SOFT, SLIGHTLY FINE SANDY, NO STRUCTURE	
	////**///		C		
16.5	////**///		C		
16.5-18.0	***-/-***		C	**SAND**, SILTY, CLAYEY, LAMINAR BANDING, MEDIUM DENSE, MOIST	
	-/-		C		
18.0	***-/-***		C		
18.0-20.0	***//oo**		C	**SAND**, CLAYEY, GRAVELLY, VERY DENSE, MOIST, VERY COMPACT, MEDIUM SAND, RED-BROWN,	
	***//oo**		C	SOME 1-2" GRAVEL	
	***//oo**		C		
20.0	***//oo**	20	C		
20.0-21.5	///--*///		C	**CLAY**, VERY SILTY, SANDY (VERY FINE), WET, SOFT, SLIGHTLYBLOCKY, BROWN	
	///--*///		C		
21.5	///--*///		C		
21.5-22.9	///***///		C	**CLAY**, VERY FINE, SANDY, WET, SHOWS FREE WATER IF WORKED, LAMINAR BANDING	
	///***///		C		
22.9	///***///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PROJECT: CINIZA REFINERY

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6942.5
TOTAL DEPTH: 40.0 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.0 FEET
BORING ID: RW-5
PAGE: 2 OF 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
22.9-24.1	///**////		C	**CLAY**, VERY FINE, SANDY, AS ABOVE BUT LESS MOISTURE	
24.1	///**////		C		
24.1-25.0	000//*000		C	**GRAVEL**, CLAYEY, WET/MOIST, SOME GREATER THAN 3" SANDSTONE PIECES	
25.0	000//*000	25	C		
25.0-28.0	////*////		C	**CLAY**, SLIGHTLY FINE SANDY, WET, LAMINAR BANDING, BROWN TO RED-BROWN, STIFF	
	////*////		C		
	////*////		C		
	////*////		C		
	////*////		C		
28.0	////*////		C		
28.0-28.6	*********		C	**SAND**, FINE, DENSE, MOIST, VERY STRONG HYDROCARBON ODOR, LIGHT BROWN, SOME PEBBLES	
28.6-30.0	***SHSH**		C	**SANDSTONE**, SHALEY, HYDROCARBON ODOR, HARD, FRACTURED, LIGHT GREEN TO WHITE,	
	***SHSH**		C	ARGILLACEOUS	
30.0	***SHSH**	30	C		
30.0-31.0	***SHSH**		C	**SANDSTONE AND SHALE PIECES**, HYDROCARBON ODOR, HARD, WHITE/GREEN MOTTLED	
31.0	***SHSH**		C		
31.0-34.0	000000000		C	**GRAVEL**, FINE, VERY WET, **WATER BEARING**, DENSE	
	000000000		C		
	000000000		C		
	000000000		C		
	000000000		C		
34.0	000000000		C		
34.0-40.0	SHSH**SHS		C	**SHALE**, SANDY, HARD, FISSLE, GREY/RED, DRY, NO ODOR	
	SHSH**SHS	35	C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
	SHSH**SHS		C		
40.0	SHSH**SHS	40	C		
TD					

LOGGED BY: WHK

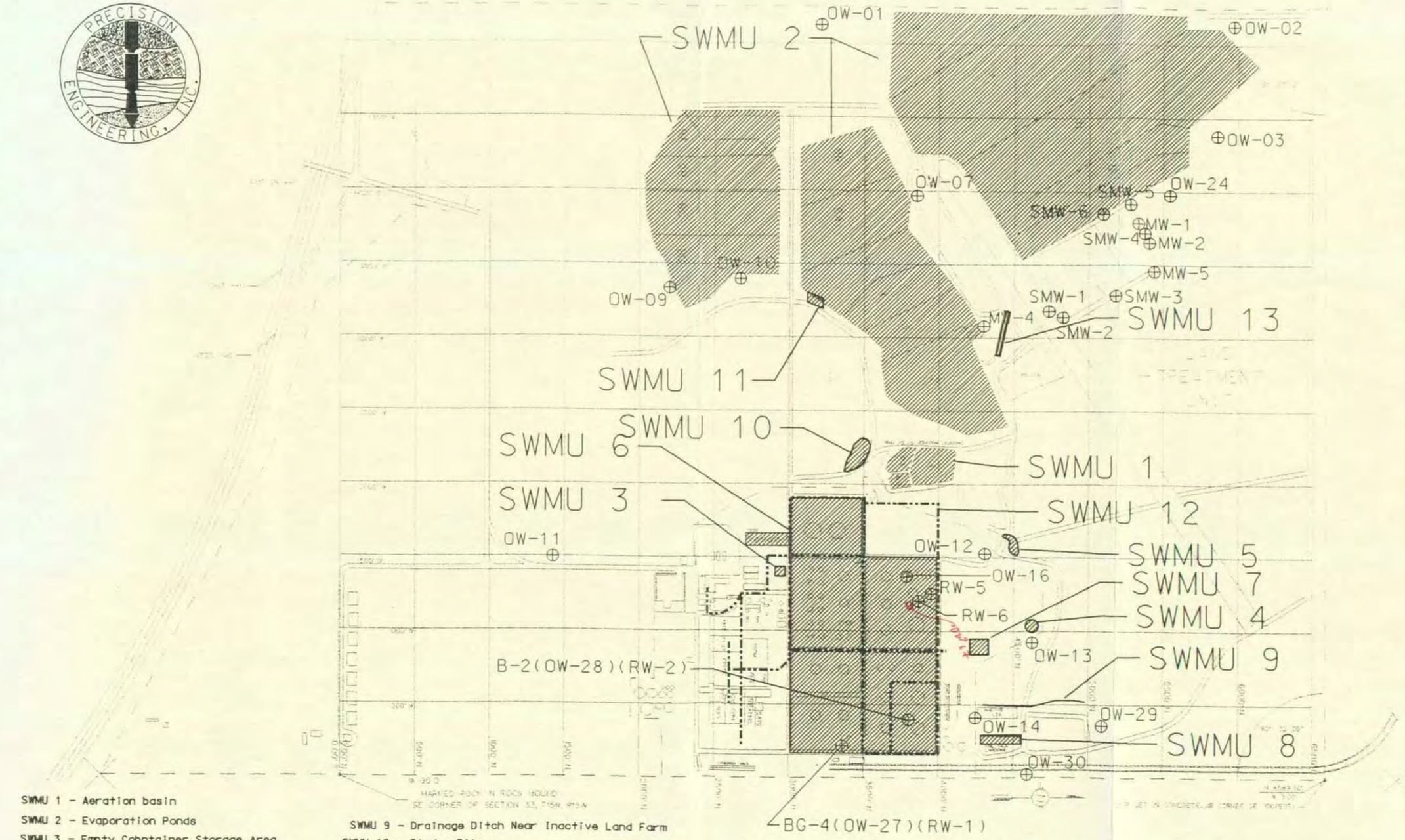
SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

Attachment D

CINIZA REFINERY

SWMU & WELL LOCATIONS

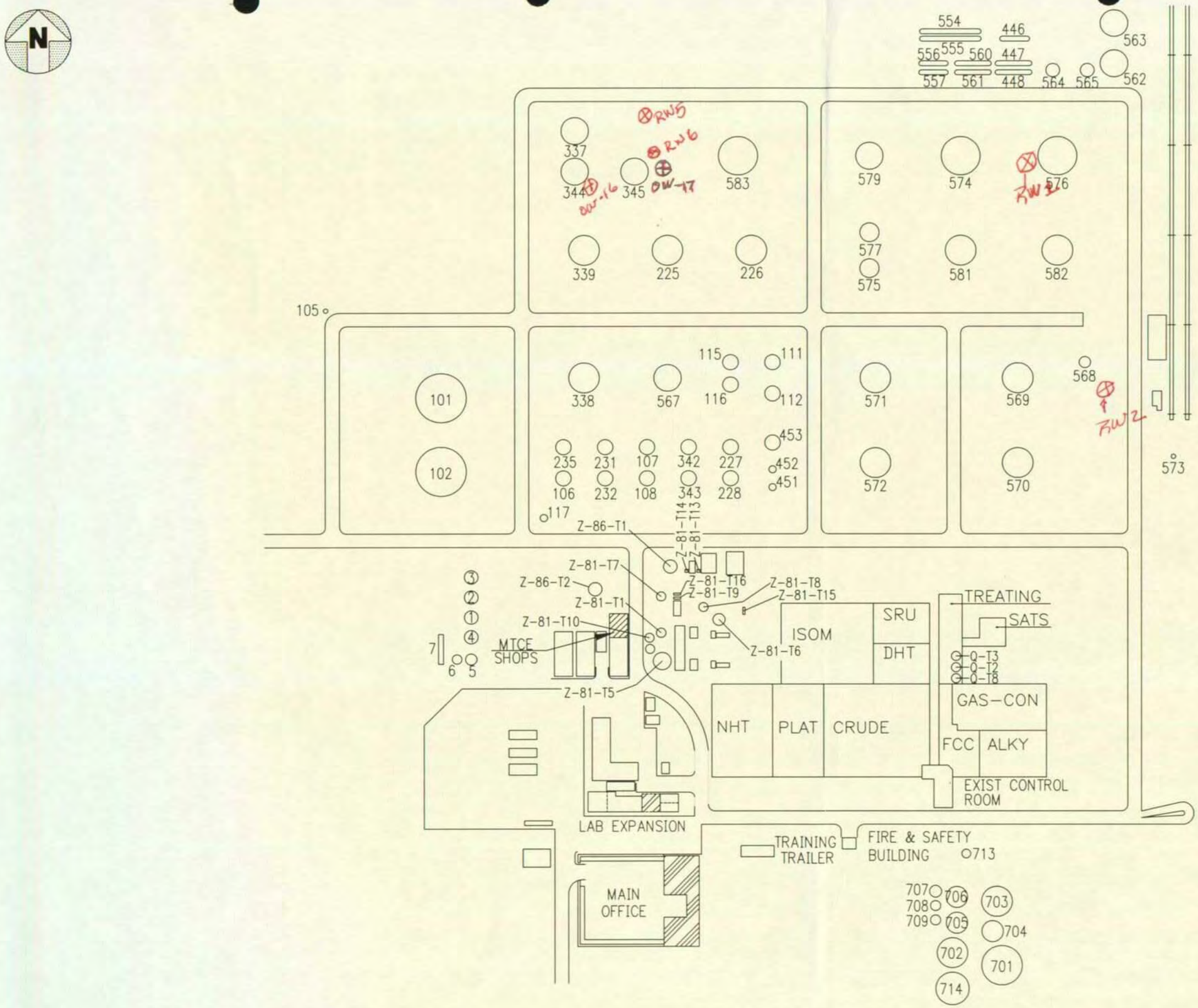
PRECISION ENGINEERING, INC.



SWMU 1 - Aeration basin
SWMU 2 - Evaporation Ponds
SWMU 3 - Empty Cobntainer Storage Area
SWMU 4 - Old Burn Pit
SWMU 5 - Land Fill Area
SWMU 6 - Tank Farm
SWMU 7 - Fire Training Area
SWMU 8 - Railroad Rack Lagoon

SWMU 9 - Drainage Ditch Near Inactive Land Farm
SWMU 10 - Sludge Pits
SWMU 11 - Secondary Oil Skimmer
SWMU 12 - Contact Waste Water Collection System
SWMU 13 - Drainage Ditch Between API Evaporation Ponds and Neutralization Tank Evaporation Ponds

COLOR CODE: SONSELA WELLS
CHINLE/ALLUVIUM INTERFACE WELLS
UPPER SAND WELLS



as of 12/11/02
A Mancini

CONTRACTOR:

CINIZA REFINERY — GIANT REFINING CO. A DIVISION OF GIANT INDUSTRIES — GALLUP NEW MEXICO

GIANT REFINERY
TANK FARM PLAN

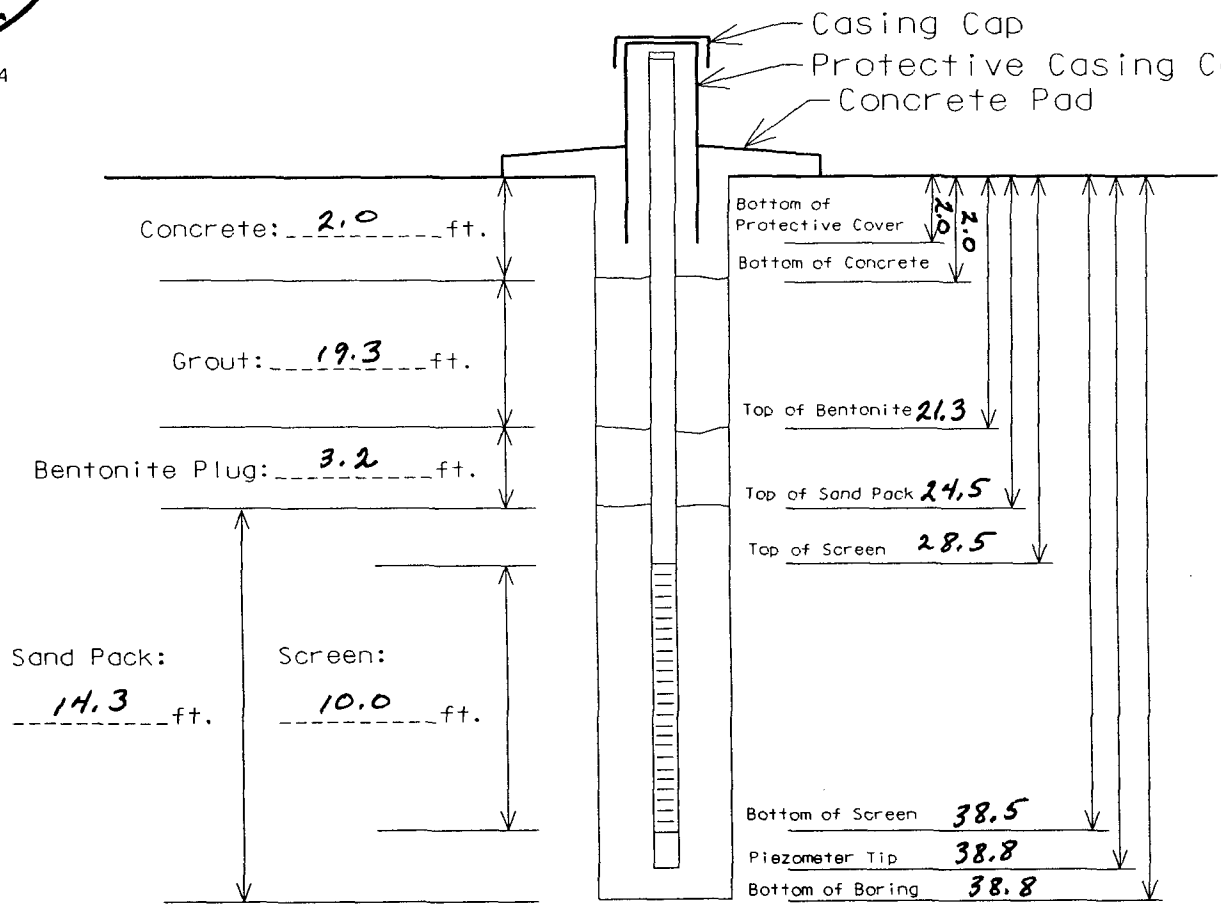
DRN. BY: CLM	DATE: 10DEC02	RFE/RFC No: –
CHK'D. BY: –	DATE: –	SCALE: NTS
APP'D. BY: –	DATE:	CAD REF: G:/~~BULLWINKLE~~
WELD SPEC: –	PAINT: –	
DRAWING NO. Z-01-100		REV 0

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. RW-6



Boring Diameter: 9.25

Sand Type: 20-40

Bollards, Type/Size: 3" STEEL PIPE

Bentonite: 3/8" CHIP

Screen Type/Size: 4"S 40 PVC/0.010" MACHINE SLOT

Cement/Grout: 6% BENT./CEMENT

Riser Type/Size: 4" SCH 40 FLUSH JOINT PVC

Water: 31.5

Locking Expandable Casing Plug? YES

Site Northing: 3876.0

Other: PRODUCT 29.5

Bottom Cap Used? YES

Site Easting: 1208.0

Project #: 97-070

Project Name: GIANT REFINING - CINIZA

Elevation: 6972.6 (GROUND)

PROJECT: Ciniza Refinery

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6972.6
TOTAL DEPTH: 38.5 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.5 FEET
BORING ID: RW-6
PAGE: 1 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0-5.0	/oo/o/oo/		C	**Gravel**, fine, clayey, moderatly dense, moist, red-brown, some pieces to 2".	
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
5.0	/oo/o/oo/	5.0	C		
5.0-8.0	//-*-*///		C	**Clay**, silty, very fine sand, red-brown, soft, wet, laminar banding.	
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
8.0	//-*-*///	8.0	C		
8.0-9.0	*********		C	**Sand**, fine, red-brown, moist, loose.	
9.0	*********		C		
9.0-12.5	*********		C	**Sand**, fine, red-brown, laminar banding, moist, some medium, mostly fine, medium	
	*********	10	C	dense.	
	*********		C		
	*********		C		
	*********		C		
	*********	12	C		
12.5	*********		C		
12.5-13.5	*********		C	**Clay**, wet, brown, laminar banding, fine blocky blocky, soft.	
13.5	*********		C		
13.5-15.0	/***/***/		C	**Sand**, fine, clayey, moist, medium dense, red-brown, laminar banding.	
	/***/***/		C		
15.0	/***/***/	15	C		
15.0-17.0	*********		C	**Clay**, very fine sandy, silty, wet, soft, red-brown, laminated.	
	*********		C		
	*********		C		
17.0	*********		C		
17.0-17.4	*********		C	**Sand**, medium, loose, light brown, moist.	
17.4-23.0	//-*-*///		C	**Clay**, very fine sandy, silty, wet, soft, red-brown, laminated, some	
	//-*-*///		C	thin cleaner sand.	
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///	20	C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PROJECT: Ciniza Refinery

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6972.6
TOTAL DEPTH: 38.5 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.5 FEET
BORING ID: RW-6
PAGE: 2 OF 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
17.4-23.0	//-*-*///		C	**Clay**, very fine sandy, silty, wet, soft, red-brown, laminated, some	
	//-*-*///		C	thin cleaner sand.	
	//-*-*///		C		
	//-*-*///		C		
	//-*-*///		C		
23.0	//-*-*///		C		
23.0-23.5	**/***/**		C	**Sand**, coarse, clayey, dense, red-brown, moist.	
23.5-31.5	**/*//*/*		C	**Sand**, clayey, fine, wet, red-brown, laminar banding, moderately dense.	
	**/*//*/*		C		
	**/*//*/*	25	C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*	30	C		
	**/*//*/*		C		
	**/*//*/*		C		
31.5	**/*//*/*		C		
31.5-33.5	**O**O***		C	**Sand**, gravelly, strong hydrocarbon odor, water bearing, grey-brown, dense.	
	OO***		C		
	OO***		C		
33.5	**O**O***		C		
33.5-38.5	ShShShSh		C	**Shale**, green-grey, sandy, hard, dry, no odor.	
	ShShShSh		C		
	ShShShSh	35	C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
T.D. 38.5			C		
			C		
		40	C		
			C		
			C		
			C		
			C		
			C		
			C		

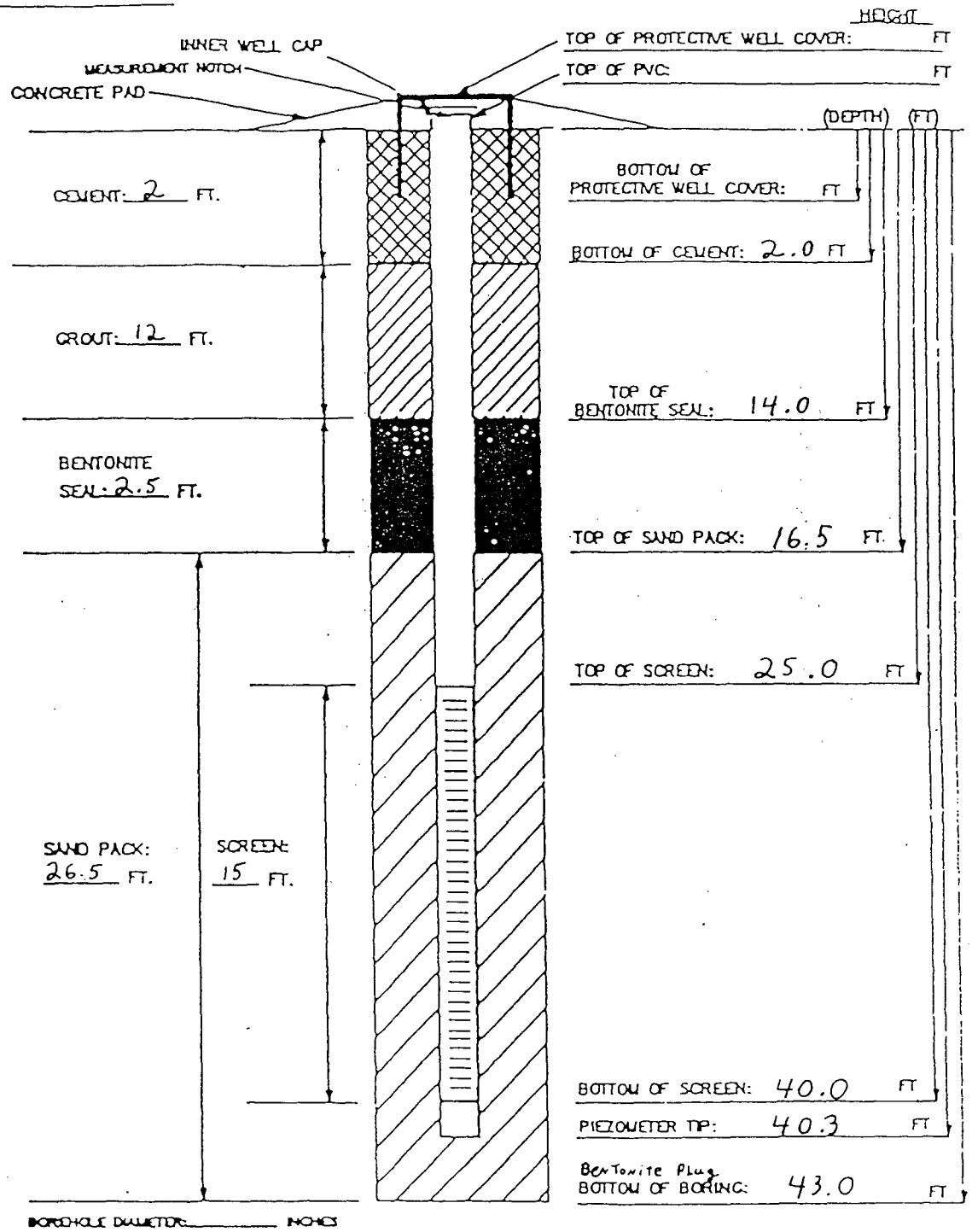
LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

364, OW 27 & RW 1

INSTALLATION DATE: 032895

INSTALLATION DIAGRAM
MONITORING WELL NO. _____



MATERIALS USED:

SAND TYPE AND QUANTITY: 20-40
BENTONITE PELLETS (5-GALLON BUCKETS): 1
BAGS OF GROUT: 1
AMOUNT OF CEMENT: 8 - 94# Bags + 75# Gel
AMOUNT OF WATER USED: 8 gal
OTHER:

Bottom Cap Used? YES
Screen Lengths: 15'
Riser Used: 30'
Top Cap Used? _____
Well Size: 4" Dia

J-Plug Used? YES
Flush Mount Vault _____
Avove Ground Vault YES
Bollards, No. & Size:

TASK: Tank 569 GEOLOGIST/ENGINEER: W H K

E Tank 568 GW 27 & RW1

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28.0
BORING ID: BG4
PAGE: 1

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-0.3	*********		C	Sand, fine, dry, brown, loose	
0.3-0.4	xxxxxxxxx	1.0	C	Asphalt Cement Concrete	11.0
0.4-5.0	///***///		C	Clay, sandy, wet, brown, firm, (fill), odor below 3.9', water saturated @ 4.8'	>1438
	///***///		C	bottom of fill is at 4.8'	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
5.0-11.8	///--+///	5.0	C	Clay, silty, blocky, wet, brown, firm, scattered carbonate filaments, some	0.0
	///--+///		C	nodules, native, no odor, redder >10'	
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///		C		
	///--+///	11	C		
	///--+///		C		
11.8-13.0	///***///	12	C	Clay, sandy, very fine, wet, red brown to brown, soft	0.0
	///***///		C		
13.0-14.1	////+++//	13	C	Clay, stiff, fissured, wet, brown, some carbonate nodules	0.0
	////+++//		C		
14.1-14.6	*********	14	C	Sand, fine, clean, damp, white, loose	0.0
14.6-15.0	///**0*//		C	Clay, sandy, slightly gravelly, wet, brown, very stiff to hard	0.0
15.0-16.9	///**////	15	C	Clay, very fine sandy, laminar bedded, wet, brown, soft	0.0
	///**////		C		
	///**////		C		
	///**////		C		
16.9-18.1	///*/////	17	C	Clay, very fine sandy, slightly less than above, slightly blocky, wet, brown, firm	0.0
	///*/////		C		
	///*/////	18	C		
18.1-19.8	****//***		C	Sand, some clay, sandy in bands, moist to wet, brown, moderately dense to soft	0.0
	****//***		C	interbedded with finer soil	
19.8-21.3	000***000		C	Gravel, sandy, moist, light grey to white, dense, subrounded	0.0
	000***000	20	C		
	000***000		C		
	000***000	21	C		
21.3-21.8	///***///		C	Clay, sandy, wet, brown, soft	
21.8-25.5	000**/000	22	C	Gravel, slightly sandy, some clay as binder, moist, grey to brown, dense	
	000**/000		C	odor @ 24.4'	20 @ 22.5'
	000**/000		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28.0
BORING ID: BG4
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	000**/000		C	continued from page 1	
	000**/000	24	C		
	000**/000		C		160 @ 24.4'
	000**/000	25	C		
25.5-29.4	*********		C	Sand, fine, clean of silt and clay, moist, brown, loose	45.0
	*********	26	C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********	29	C		
29.4-30.5	*********		C	Sand as above but very weakly water bearing @ 29.4', grey to black, strong odor	1100
	*********	30	C		
30.5-31.2	///***///		C	Clay, sandy, wet, brown, soft, odor	770
	///***///	31	C		
31.2-34.0	///+++///		C	Clay, blocky, wet, very stiff, numerous carbonate filaments, brown, slightly	770
	///+++///		C	fissured, odor	
	///+++///		C		
	///+++///		C		
	///+++///		C		
34.0-35.0	***---***	34	C	Sand, silty, very fine, does not appear water bearing, but sample covered with	700
	---		C	water from above, very dark brown to black, soft, strong odor	
35.0-37.3	***///***	35	C	Sand, very fine, clayey, saturated, water bearing zones--2" thick, gradational to	1000
	///		C	clay below, brown, strong odor	
	///		C		
	///		C		
	///	37	C		
37.3-39.2	///+++///		C	Clay, wet, brown, stiff, carbonate filaments, soft to firm, not blocky or fissured	320
	///+++///		C		
	///+++///		C		
	///+++///	39	C		
39.2-40.9	000**/000		C	Gravel, sandy, slightly clayey, water bearing, brown, dense, rounded to subrounded	800
	000**/000		C	odor	
	000**/000		C		
40.9-45.0	----*----	41	C	CHINLE FORMATION	
	----*----		C	Shale, slightly sandy, fissle, fissured, slightly blocky, moist, red brown, hard	2.0
	----*----		C	some grey green banding, no odor	
	----*----		C		
	----*----		C		
	----*----		C		
	----*----		C		
	----*----		C		
45.0-48.5	----**---	45	C	Shale, sandy, fissle, moist to damp, hard, water from above runs into fissle	
	----**---		C	partings (dry on interior of sample) difficult to obtain uncontaminated sample	
	----**---		C	dark red brown, suspect samples taken may be contaminated by water from above	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6943.7
TOTAL DEPTH: 48.5
LOGGED BY: WHK
DATE: 3-28-95
STATIC WATER: 28'-7"
BORING ID: BG4
PAGE: 3

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	----**---		C	continued from page 2	
	----**---	47	C		23 @ 47.0'
	----**---		C		
	----**---	48	C		
	----**---		C		12 @ 48.5'
TD				stop drilling 11:05a	
				water @ 18.8' @ 11:30a -- 8" of hydrocarbon on water @ 2:00p water level @ 28'-7"	
				completed 4" well, screened from 25' to 40'	
				(see attached completion diagram)	

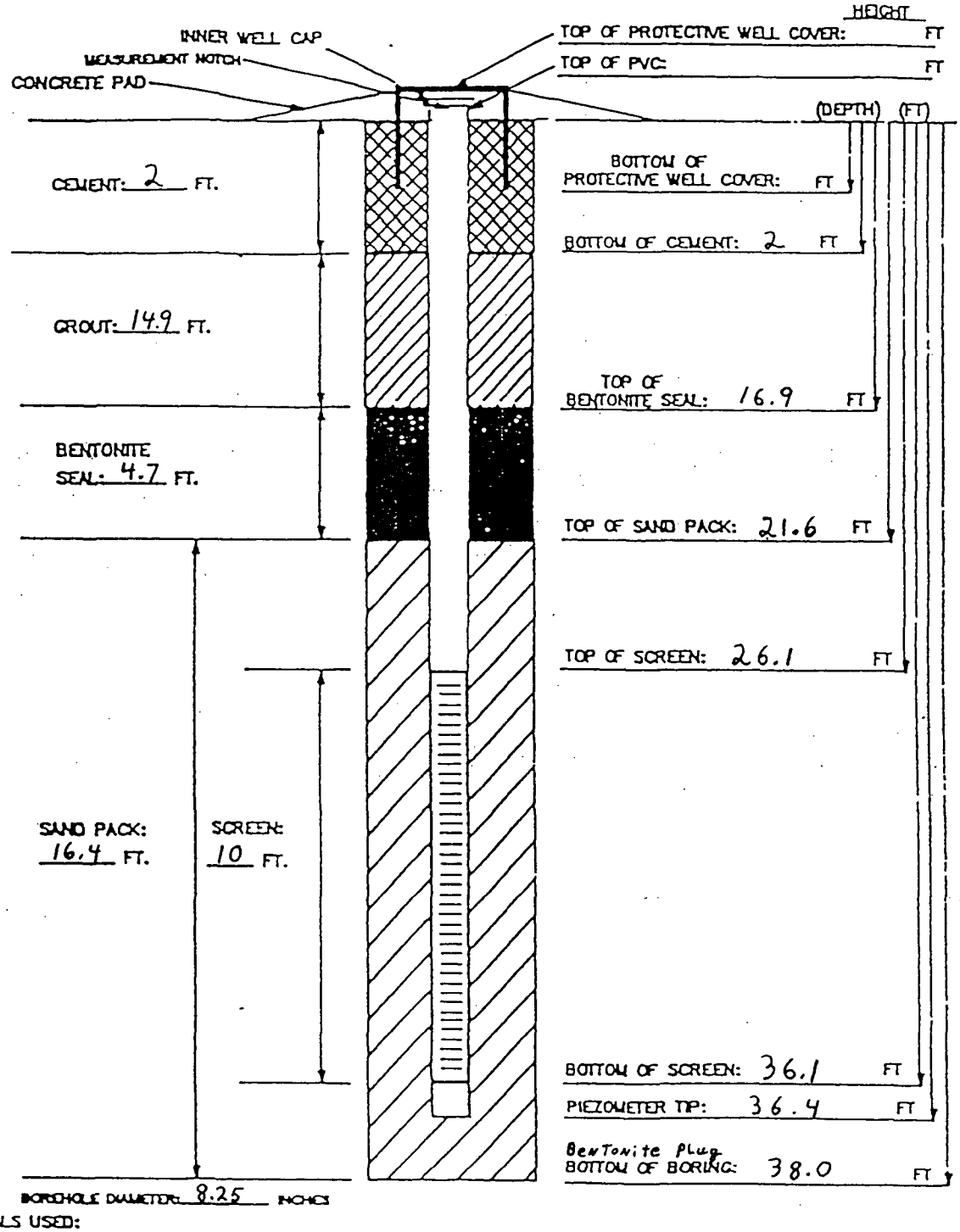
LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

B2, RW28, RW2

INSTALLATION DATE: 032995

INSTALLATION DIAGRAM
MONITORING WELL NO. _____



MATERIALS USED:

SAND TYPE AND QUANTITY: 20-40
BENTONITE PELLETS (5-GALLON BUCKETS): 2
BAGS OF GROUT:
AMOUNT OF CEMENT: 8 - 94# Bags + 75# Gal
AMOUNT OF WATER USED: 8 Gal
OTHER:

Bottom Cap Used? YES
Screen Lengths: 10'
Riser Used: 30'
Top Cap Used? _____
Well Size: 4" Dia.

J-Plug Used? YES
Flush Mount Vault _____
Avove Ground Vault YES
Bollards, No.& Size:

TASK: Tank 569 GEOLOGIST/ENGINEER: WHK

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan
Tank 576

LOG OF TEST BORINGS

OU-28

FILE #: 95-018
ELEVATION: 6927.3
TOTAL DEPTH: 38.0
LOGGED BY: WHK
DATE: 3-29-95
STATIC WATER: 24'-3"
BORING ID: B2
PAGE: 1

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-5.0	///-*////		C	start at 10:00a	
	///-*////		C	Clay, slightly silty, little sand, wet, brown, soft to firm, no odor	0.0
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////	5.0	C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////		C		
	///-*////	8.0	C		
8.4-10.6	///***///		C	Clay, fine sandy, gradational fine above and to below, wet, brown, firm, no odor	0.0
	///***///		C		
	///***///		C		
	///***///	10	C		
10.6-12.0	***---***		C	Sand, silty, fine, moist, light red brown, loose, no odor	0.0
	---		C		
	---		C		
12.0-12.5	***OOO***	12	C	Sand, very gravelly, to 2", moist, light red brown, dense, slightly rounded rock	0.0
12.5-13.1	***---***		C	Sand, silty, moist, light red brown, loose, no odor	0.0
13.1-15.0	///**--//	13	C	Clay, sandy, silty, moist, red brown, firm to stiff, some root filaments	0.0
	///**--//		C		
	///**--//		C		
	///**--//		C		
15.0-16.8	***///***	15	C	Sand, clayey, fine, moist, red brown, moderately dense, no odor	0.0
	///		C		
	///		C		
	///		C		
16.8-19.1	//*++-///	17	C	Clay, silty grading to very fine sandy, moist to wet, red brown, stiff, no odor	0.0
	//*++-///		C	carbonate filaments common	
	//*++-///		C		
	//*++-///		C		
	//*++-///	19	C		
19.1-20.0	//--OO++/		C	Clay, silty, large gravel present (2"), wet, dark brown, hard, no odor	0.0
	//--OO++/	20	C	numerous carbonate filaments	
20.0-23.6	//--++///		C	Clay, silty, brown, stiff, slightly blocky, no odor, carbonate filaments	0.0
	//--++///		C		
	//--++///		C		
	//--++///		C		
	//--++///		C		540 @ 22.6'
	//--++///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6927.3
TOTAL DEPTH: 38.0
LOGGED BY: WHK
DATE: 3-29-95
STATIC WATER: 24'-3"
BORING ID: B2
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.6-24.2	***OO****		C	Sand, coarse, some fine gravel, saturated but does not appear water bearing, brown	1000
	OO*	24	C	dense, hydrocarbon odor	
24.2-25.5	/////////		C	Clay, wet, not water bearing, brown, stiff, hydrocarbon odor	1060
	/////////	25	C		
25.5-27.1	***///***		C	Sand, clayey, water bearing, brown, odor	610
	///		C		
	///		C		
27.1-28.5	/////////	27	C	Clay, some sand @ 28'-28.5', wet, brown, soft, slightly blocky, hydrocarbon odor	
	/////////		C	saturated but not water bearing	
	/////////	28	C		
28.5-30.9	///***///		C	Clay, sandy, some laminations, wet, brown, stiff	60
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
30.9-32.9	000**0000	31	C	Gravel, some sand, silica rock, water bearing, brown, dense, rounded to subrounded	1030
	000**0000		C		
	000**0000		C		
	000**0000		C		
32.9-35.0	---------	33	C	CHINLE FORMATION	
	---------		C	Shale, weathered, wet to moist, some green mottling, red brown overall, stiff	20
	---------		C	weak odor	
	---------		C		
35.0-38.0	----*-----	35	C	Shale, as above, slightly more sand, blocky, dark red brown, wet to moist	57
	----*-----		C	suspect contamination by water flowing from gravel above--gravel produces more	
	----*-----		C	water at this location than previous drilling	
	----*-----		C		
	----*-----		C		
	----*-----		C		
	----*-----	38	C		
TD				stop drilling 11:25a	
				completed 4" well - see attached well completion diagram	
				24'-3" to water	
				2" product on water	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.
505-523-7674

Well Closure Report

Well Identification: OW-20
Date of Closure: JANUARY 15, 1999
Water Depth At Closure: 32.10' Below Ground Surface

Length of Casing Extracted: 0 ft Interval: -- to --

Length of Perforated Casing: 0 ft Interval: -- to --

Length of Screen Extracted: 0 ft Interval: -- to --

Well Diameter: 4 in Interval: 0 to 59 (measured)
-- in Interval: -- to --
-- in Interval: -- to --
-- in Interval: -- to --

Gravel or Sand Pack Length: 14 ft Interval: 50 to 64
(reported) -- ft Interval: -- to --
-- ft Interval: -- to --
-- ft Interval: -- to --

Estimated Sand/Gravel Pack Void Ratio: 0.45

Estimated Total Well Volume (Including Sand/Gravel Pack): 21.4 ft³

Volume of Grout: 1) 35.8 ft³ Type: 11#-Portland Type I-II/Bentonite
Bentonite 6%
Interval: >50' to --
Tremmie Depth: 59'

2) 14.0 ft³ Type: 14#-Portland Type I-II/Bentonite
Bentonite 6%
Interval: 0 to 59'
Tremmie Depth: 59'

3) -- ft³ Type: --
--
Interval: -- to --
Tremmie Depth: --

Total Grout Volume: 49.8 ft³ Crew Foreman: William Kingsley

Notes: Grout shrink back @ 24 hr - 0.5'

GROUT VOLUME FOR OW-2D 1-15-99

ESTIMATE

RST 9" ANNULUS - (DRILLED W 7 5/8" OD HSA)

VOLUME OF ANNULUS:

ASSUMES BORING EXTENDED TO 83' & BACKFILLED W/CUTTINGS

TO 64' - CUTTING VOID RATIO = 0.65

VOLUME 83-64 = $[(83-64)(0.65)]\left[\frac{\pi (9/12)^2}{4}\right] = 5.5\ FT^3$

VOLUME OF GRAVEL PACK -

VOLUME 64-50 = $[(64-50)(0.45)]\left[\frac{\pi (9/12)^2}{4}\right] = 2.8\ FT^3$

VOLUME TO SURFACE

VOLUME 50-0 = $[50-0]\left[\frac{\pi (4/12)^2}{4}\right] = 13.1\ FT^3$

TOTAL VOLUME = 21.4 FT^3

BORING OW-20

SURFACE ELEVATION: 6981 FEET

LABORATORY TEST DATA

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

PENETRATION RATE MINUTES/FOOT	SYMBOLS	DESCRIPTION
5.0	FILL	FILL
1.2		
1.3	CL	TRIASSIC PERIOD CHINLE FORMATION GRAY SILTY, FINE SANDY CLAY, SOFT, HIGHLY WEATHERED
1.7		
1.5		
1.5		GRADES WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE FROM 29 FEET
1.9		
3.3	SHALE	40 FEET: SHALE, REDDISH BROWN, SILTY, WITH SOME FINE SAND, AND OCCASIONAL THIN INTERBEDS OF SANDSTONE AND LIMESTONE, SOFT, FRESH
3.0		
2.7		
4.0		
2.3		
3.4		
1.6	MS	60 FEET: MUDSTONE, REDDISH BROWN, INTERBEDDED WITH LAMINAE OF WHITE TO LIGHT BROWN SANDSTONE, SOFT, FRESH
3.2		
6.3	SS	70 FEET: SANDSTONE, BROWN, COARSE-GRAINED, COMPOSED OF QUARTZ WITH MINOR CHERT, AND LIMESTONE, HARD, FRESH
6.0		
6.3		
	SHALE	82 FEET: SHALE, GRAY, SILTY WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 83.0 FEET ON 12/19/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 54.0 TO 64.0 FEET.
GRAVEL PLACED FROM 50.0 TO 64.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 50.2 FEET BELOW GROUND ON 1/5/81.

FILE COPY

LOG OF BORINGS

DAMES & MOORE

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 1 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 20.0
LOGGED BY: WHK
DATE: 1-14-99
STATIC WATER:
BORING ID: OW-20R1
PAGE: 1 of 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0	///**////			**Clay,** very fine sandy, some gravel, wet red-brown.	
	///**////				
1.5	///**////				
1.5	***//****			**Sand,** fine, clayey, moist, red-brown.	
2.7	***//****				
2.7	ooo//oooo			**Gravel,** sandstone, clayey, moist, red-brown.	
3.5	ooo//oooo				
3.5	/////////			**Clay,** weak carbonate nodules, hard, wet, red-brown.	
	/////////				
	/////////	5.0			
5.5	/////////				
5.5	///*//*//			**Clay,** sandy, firm, wet, red-brown.	
	///*//*//				
	///*//*//				
	///*//*//				
	///*//*//				
8.3	///*//*//				
8.3	**o**o**o			**Sand,** coarse, gravelly, dense, moist, light brown.	
	oo**o				
	oo**o	10			
	oo**o				
	oo**o				
	oo**o				
	oo**o				
	oo**o				
	oo**o				
13.5	**o**o**o				
13.5	*o*o*o*o*			**Sand/Gravel,** coarse, water bearing (weak), dark grey.	
14.5	*o*o*o*o*				
14.5	/////////	15		**Clay,** soft, wet, not water bearing, grey/black.	
15.0	*********			**Sand,** fine, loose, water bearing, black.	
15.9	*********				
15.9	///*///*/			**Clay,** slightly sandy, firm, wet not water bearing, red-brown.	
	///*///*/				
	///*///*/				
	///*///*/				
18.8	///*///*/				
18.8	//*//*//*			**Clay,** sandy, soft, saturated, glistening (does not make water),	
	//*//*//*			black mottled.	
20.0	//*//*//*	20			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8- OD HSA

PROJECT: CINIZA OW-20
Replacement 2 Continuous Sampling

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 335.0
LOGGED BY: WHK
DATE: 1-15-99
STATIC WATER: 29.0
BORING ID: OW-20 Rep
PAGE: 1 of 2

DEPTH	PLOT	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0-12.5	*********		**Sand,** coarse, sandstone gravel up to three inches at five feet, medium dense, moist, red-brown.	No odor
	*********	5.0		
	*********	10	more dense	
12.5	*********			
12.5	////**///		**Clay,** fine sandy, soft to firm, wet (not water bearing), red-brown, laminar banded.	
	////**///	15		
15.4	////**///			
15.4	//--**--/		**Clay,** very silty, fine sandy, soft, wet, red brown.	
17.2	//--**--/			
17.2	*********		**Sand,** fine, loose, brown.	
17.5	*********			
17.5	//**--**/		**Clay,** fine sandy, very slightly silty, soft, wet, red-brown.	
	//**--**/	20		
23.2	//**--**/			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8" OD HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 2 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 35.0
LOGGED BY: WHK
DATE: 1-15-98
STATIC WATER: 29.0
BORING ID: OW-20 rep
PAGE: 2 of 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.2	//////////	23		**Clay,** soft, wet, red-brown.	No Odor
24.0	//////////				
24.0	**-**-**-			**Sand,** fine, silty, loose, wet (very weak water bearing?), grey overall	Fetted
25.0	**-**-**-	25		with black bands.	Odor
25.0	*********			**Sand,** fine, silty, loose, **water bearing**, brown/grey.	
26.4	*********				
26.4	//-//-//-			**Clay,** silty, soft, wet, not water bearing, some grey/black banding.	
27.5	//-//-//-				
27.5	*********			**Sand,** fine, loose, **water bearing,** grey/black.	
28.0	*********				
28.0	//*//*//*			**Clay,** fine sand, stiff, wet, not water bearing, red-brown/grey,	
28.9	//*//*//*				
28.9	**/**/**/	30		**Sand,** clayey, loose, wet, not water bearing, grey.	
31.9	**/**/**/				
31.9	**o**o**o			**Sand,** gravel (sandstone and chert, some degraded shale), moderately dense,	No Odor
33.5	**o**o**o			wet, not water bearing, dark grey, 3 inch sandstone layer at 33.2-33.5.	
33.5	---------			**Shale,** some reduction mottling, fine blocky, hard, damp to moist, red-brown.	
35.0	---------	35		[CHINLE FORMATION] WHK	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8 OD HSA

PRECISION ENGINEERING, INC.
P.O. BOX 422 • LAS CRUCES, NM 88004
Ph: (505) 523-7674
FAX: (505) 523-7248 • E-mail: werpei@aol.com

October 20, 1998

Ms. Dorinda Mancini
Giant Refining Company
Ciniza Refinery
Route 3, Box 7
Gallup, New Mexico 87301

Re: Well Closure Procedures

Dear Ms. Mancini,

As you are aware there a variety of monitoring well installation types at the Ciniza Refinery site. The following summarizes a proposed task scenario for a typical well closure at the Ciniza facility.

Task I: Remove all surface vaults and protective casings.

Task II: Determine if the casing has been grouted into the formation.

A: If the casing has been grouted a determination will be made as to the potential for pulling the casing. If the casing cannot be safely extracted or cannot be extracted with reasonable effort, proceed to Task III.

B: If the casing has not been grouted in place, an attempt to pull the casing will be made. If the casing cannot be pulled, the casing will be split to expose the drilling annulus. The casing will be split to a point just above the screens or perforations.

Task III: Grout tremmie tubing will be placed to the bottom of the well with a packer set just above the screens. A light grout consisting of a fluidized portland cement/montmorillonite clay (bentonite) mix will be injected into the screened zone. The grout mix will be pumped into the well and monitored for pressure and volume. The grout will be injected until the injection volume is equal to 1.5 times the calculated volume of the well and pressures indicate intrusion into the formation. A heavy grout will then be injected into the well until pump pressure stabilizes. Injection will stop, pressure will be allowed to drop, the packer(s) will be removed.

A: If the casing has been grouted in place, the remainder of the casing will then be grouted to the surface with a heavy fluidized portland cement/montmorillonite clay (bentonite) grout.

B: If the casing has not been grouted in place, the remaining annulus will be filled with a light grout as described above followed by a heavy grout when the annulus has stopped taking the light grout.

Task IV: The grout will be allowed to cure twenty four (24) hours. Any shrink back will then be filled with grout to the surface.

Task V: A closeout report will be provided to the client for final filing.

If you have any questions or comments, please call our office.

Sincerely,
Precision Engineering, Inc.

William H. Kingsley, P.E.

GIANT
REFINING COMPANY

February 11, 2003

Wayne Price
Environmental Bureau
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: January 2003 Progress Report
Giant Refining Co., Ciniza Refinery GW-032 Discharge Plan

Dear Mr. Price:

As your office has requested, Ciniza is submitting a progress report on the Discharge Plan renewal issues identified in our 12/10/02 meeting. Each month we will update you on progress made on the individual issues included in your meeting summary report. We have numbered the issues to make it easier to document and report. A copy of your list is attached. Enclosed is a copy of a facility drawing prepared by Bill Kingsley and previously used to discuss the site. We have also included a map of the main tank farm.

1. Three additional nested wells around ponds - Bill Kingsley, of Precision Engineering, Inc., visited the refinery on 1/29/03 to discuss and locate 3 potential sites on the north and west perimeter of the site. A map of the locations was faxed to you, but we were not able to discuss these with you at the time. Bill will put together a packet containing costs, time requirements, well construction details and any other pertinent information. We will include it in next month's report. He believes that these areas will give us the greatest probability of finding water. As soon as the new wells at the appropriate depths are producing, we would like to close OW-2 and OW-3. We have submitted details previously about the poor construction and production from these wells. Closing the wells on the same trip will save Giant a significant amount over having to schedule and mobilize Precision Engineering a second time for the well closings. Bill feels that the new wells will provide better monitoring for the groundwater in this area. Giant will notify OCD and HWB prior to drilling so that you will have time to schedule a site visit. (Dark blue dots on the map.)

2. Investigate tank farm area near recovery wells and install possible French drain – Bill Kingsley has logs from borings in the areas of both tank farm sites where recovery wells are located. These will be sent in one of the monthly progress reports. Please see the enclosed site map and tank farm maps for more information. Some of the borings are north of and outside the tank farm berms. (Circled in red on the map.)

3. Investigate around old OW-20 high pH area – Again, Bill will provide boring data from the area where OW-20 was located. We made several attempts to drill another well in the same area, but encountered no water. The site map indicates both the old and new OW-20 locations. (Circled in orange on the map.)

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

4. Investigate past OW-29. Find possible channels – OW-29 has never shown any contamination. We are unclear why this area may need to be investigated. We believe that OW-14, which has shown very low levels of contaminants, should continue to be monitored annually for volatiles by Method 8260. (Circled in light green on the map.)

5. Inspect the truck center – Giant's travel center has been notified and is available for inspection at your convenience.

6. Find out where OW-17 was located. Now closed, but was originally located w/in tank farm. Sonsela wells were closed in this area. – Ciniza has submitted this information previously, but will include it again in a future monthly progress report. The site map and tank farm maps are marked to show the area of interest. OW-17 was located near Tank 345. (Circled in red on the map.)

7. Prevent runoff from the old temporary pond area – The west dike on temporary pond #2 had previously been cut to allow normal drainage as requested. When salt in the water from this area became an issue, the cut in the dike was filled in and a 6" pipe with a valve on the outer end was put in place. The valve can be chained and locked in the closed position to prevent unauthorized persons from opening it, if necessary.

8. Show drainage ditches on drawings – Ciniza Refinery has prepared an Integrated Contingency Plan (ICP), including an SPCC plan, and a Stormwater Pollution Prevention Plan (SWP3) which show drainage patterns in addition to materials of significance, tank contents, locations of chemical use and storage, emergency procedures and response plans, etc. These documents will be submitted as 'Volume 2' of the Discharge Plan submittal. Included will be a topographic map of the area. (Site maps enclosed)

9. Submit storm water plan – see #8 above

10. Giant wants to monitor only OW-11, 12, 14, 29, 30 and MW 4 – We would like to develop an appropriate list of wells to be monitored, a sampling schedule that will provide needed information, and a list of parameters appropriate to contaminants needing monitoring. We will propose these as part of our submittal. We believe that OCD's and the HWB's requirements can be met without incurring extraordinary expense and personnel time for Giant.

11. Giant wants to close OW-2 and OW-3 and replace with new ones – see #1 above (Circled in dark blue on the map.)

12. Giant does not want to monitor OW-1, OW-9, and OW-10. RCA wants these wells to be checked to make sure they are still under artesian conditions – We believe that OW-1 should be monitored annually as part of the groundwater discharge plan conditions, along with the 3 new well locations proposed in #1. OW-9 and OW-10 will be visually checked annually at the same time sampling is done to ensure continued artesian conditions. It may be appropriate to sample these 2 wells at 5-year intervals (i.e., as part of the Discharge Plan renewal). As of 2/6/03 these 3 wells have artesian flow. (Circled in light blue on the map.)

13. NMED (RCRA) wants MW-1, 4, 5 and SMW-4 monitored (LTU) – These wells are sampled as required in the RCRA Post-Closure Permit issued 8/17/00. OCD will receive copies of all analytical results at the same time that they are submitted to NMED's Hazardous Waste Bureau.

14. RCA wants Pond #2 sampled – As we understand this item, the outlet at Pond #2 will be the compliance point for sampling for the wastewater treatment system / evaporation pond

system interface. Parameters will be established by OCD as part of the new Discharge Plan. Ciniza would like to confirm this interpretation as soon as possible.

15. Old API must be rebuilt or demonstrate that it is not leaking – The API Separator is scheduled for cleaning and inspection in April, 2003. As we understand the timing on construction for the new API, the unit must be complete and functional by 12/31/04. We would like to confirm this date as soon as possible.

16. Giant must complete pressure testing all plant drain lines, sumps, including the tank farms, etc. by 6/1/03. – Enclosed we are submitting documentation of all testing and repairs completed as of 1/31/03. As the system continues to be inspected, the documentation will be included with the monthly progress reports.

17. Giant must complete Discharge Plan submittal by 10/1/03 with monthly progress reports – We are currently working on the data collection and formatting for the plan using the 'Guidelines for Preparation' as our guidance. As noted above, the facility's ICP, SPCC, and SWP3 plans will provide much of the information required. We would like to confirm this deadline.

18. RCA wants monthly progress reports. – We plan to submit progress reports by the 20th of the month following the activities (2/20/03 for January 2003 activities).

19. Issues of geological channels need to be resolved – OCD and Giant will need to discuss this in more detail with Bill Kingsley. Giant would like some further guidance on OCD's and NMED's concerns. Neither I, nor Ed Riege, were present at the meeting where this was discussed.

20. LWP to spell out in DP all samples to be taken from which wells and analysis, including frequency – Giant will propose a sampling schedule, including wells, parameters and frequency. We will work with OCD and HWB to ensure monitoring will provide adequate information on the groundwater conditions at the facility.

Please feel free to contact me at 505.722.0227 or @ ***dmancini@giant.com*** with any questions or concerns you have regarding this report. Thank you for your assistance with our Discharge Plan submittal.

Sincerely

Dorinda Mancini
Environmental Manager, Ciniza Refinery

Enc

CC: Roger Anderson, OCD
Dave Cobrain, HWB
Ed Riege, Env. Superintendent
Matthew Davis, General Manager (w/o enc.)
file

12/10/02 Meeting held with Giant-Ciniza: GW-032 Dorinda Mancini, Ed Riege, LWP, RCA, Dave Cobrain.

Minutes of meeting: OCD to require the following:

1. Three additional nested wells around ponds.

2. Investigate tank farm area near recovery wells and install possible French drain

3. Investigate around old OW-20 high PH area

4. Investigate past OW-29 Find possible channels

5. Inspect the truck center

6. Find out where old OW17 was located. Now closed was inside of tank farm. Sonsela wells were closed in this area.

7. Prevent run-off from old pond area.

8. Show drainage ditches on drawings

9. Submit storm water plan

10. Giant wants to monitor only OW-11,12,14,29, 30 + MW-4

11. Giants wants to close OW-2&3 replace with new ones

12. Giant does not want to monitor OW-1,9,10 RCA wants these wells to be checked to make sure they are still under Artesia conditions.

13. NMED (RCRA) wants MW-1,4,5 SWM-4 old LTU

14. RCA wants pond #2 to be sampled.

15. Old API must be rebuilt or demonstrate it is not leaking.

16. Giant must complete pressure testing all plant drain lines, sumps, including tank farms, etc. by June 1, 2003

17. Giant must complete DP submittal by Oct 1, 2003 with monthly progress reports.

18. RCA wants monthly progress report.

19. Issues of geological channels needs to be resolved.

20. LWP to spell out in DP all samples to be taken from which wells and analysis, including frequency.

Figure No. 2
Refinery Site Map
Unconfined Storm Water Flow Direction

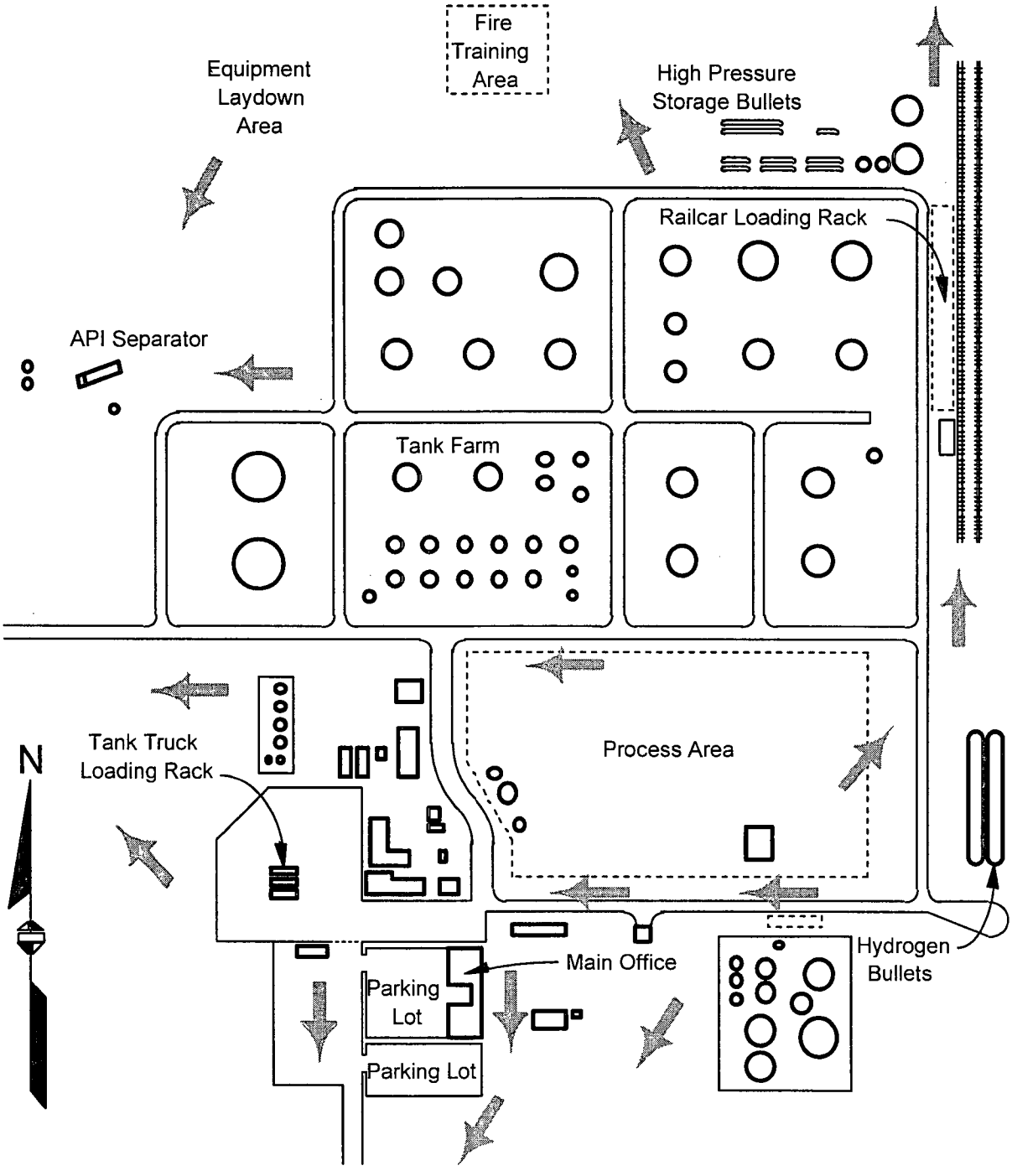
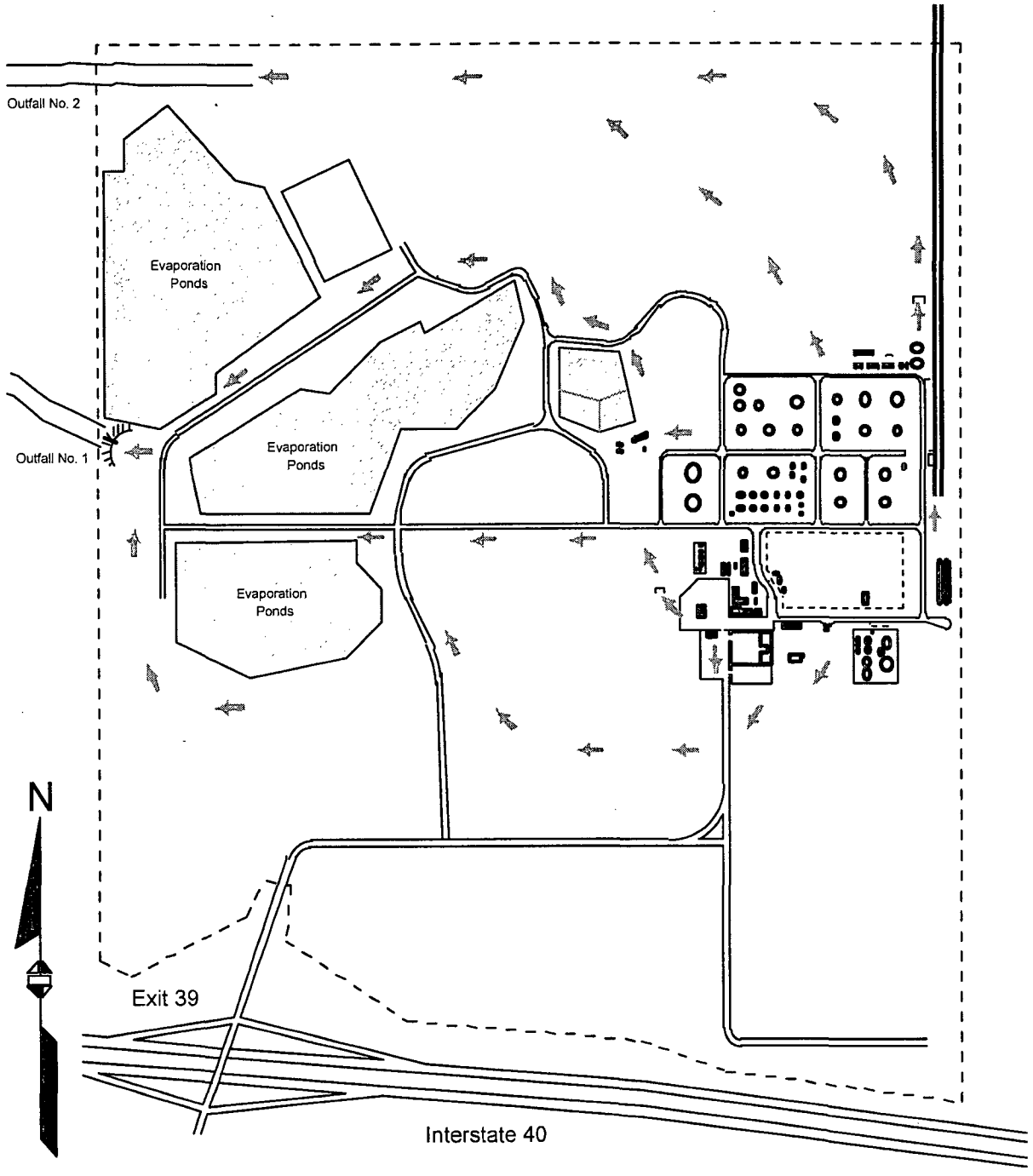
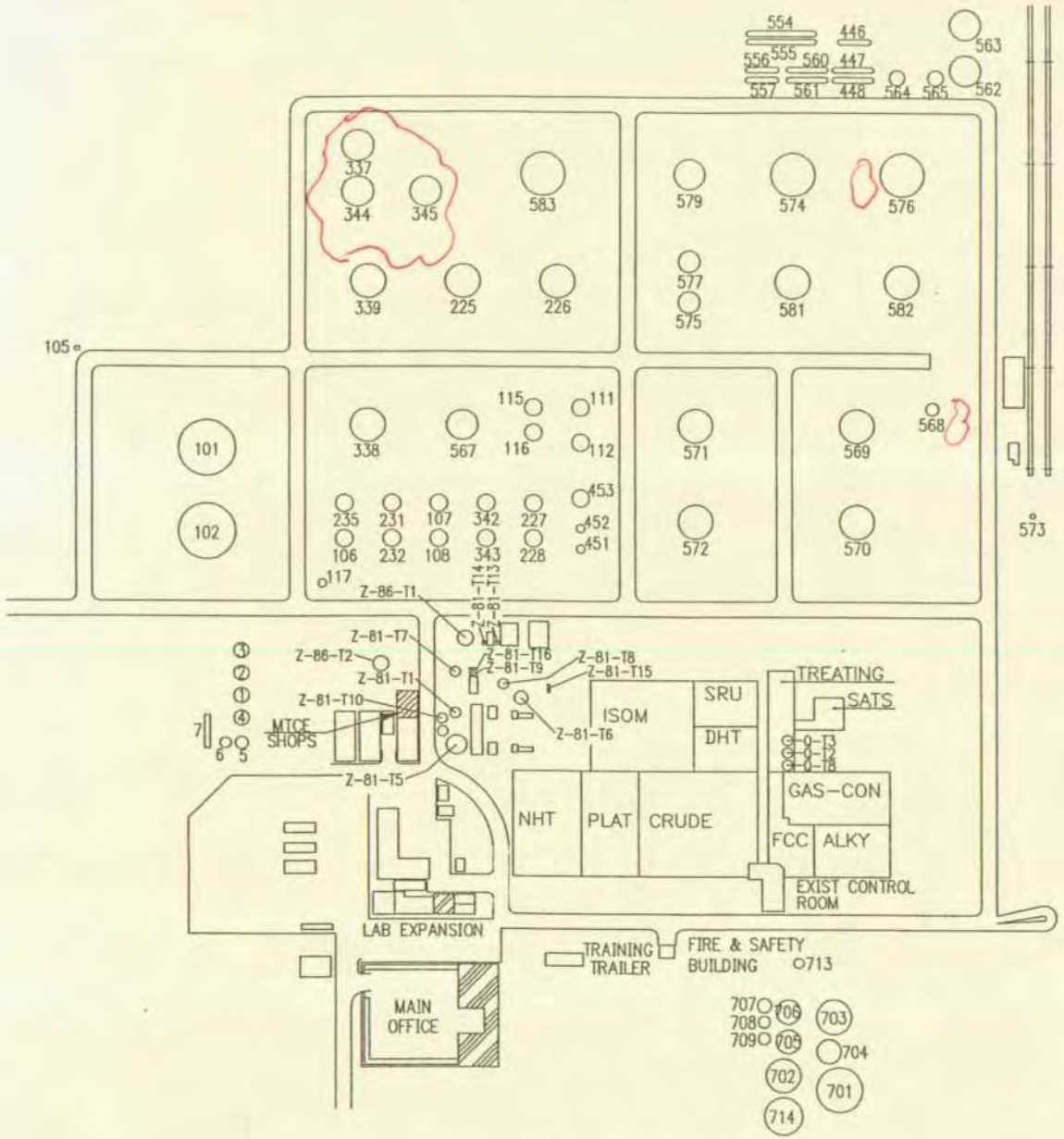


Figure No. 3
Property Site Map
Unconfined Storm Water Flow Direction





CONTRACTOR:

CINIZA REFINERY

GIANT REFINING CO. A DIVISION OF GIANT INDUSTRIES

GALLUP NEW MEXICO

GIANT REFINERY
TANK FARM PLAN

DRN. BY: CLM	DATE: 10DEC02	RFE/RFC No: –
CHK'D. BY: –	DATE: –	SCALE: NTS
APP'D. BY: –	DATE:	CAD REF'S: /GALLMOBILE
WELD SPEC: –	PAINT: –	
DRAWING NO. Z-01-100		REV 0

GIANT REFINING COMPANY

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Plat
Test Fluid:	Water
Test Water Column (ft.):	3 +
Test Duration (min.):	30
Manhole Number:	P-1, P-2, P-3, & P-4
Date:	10/31/02

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any):
N.A.

Test Witness Signature: B. Todd

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

Work Order	WO48043	Vacuum/clean sludge/dirt out of process sewer boxes P5, P6, & P8.			WO Priority 3
Location	13_PIPING	PROCES[redacted]PING			Loc/Eq Priority
Equipment					Equipment Up?
Reported By	BLOOS	Reported By Date 2002-11-07-13.	Work Phone 722-3833		Warranty Date
Status	CLOSE	Status Date 2002-11-14-8.3	Charge to Store? N		Work Type CM
GL Account	08-013-5010-00		Reserved Parts		

Job Details

Job Plan
Safety Plan
PM
Service Contract

Problem

Failure Class SEWER
Problem Code CLEAN

Follow-up Work

Originating WO
Has Follow-up Work? N

Scheduling Information

	Start	Completion
Target		2002-11-15-14.26.00
Scheduled		
Actual	2002-11-13-7.00.00	2002-11-13-10.00.00

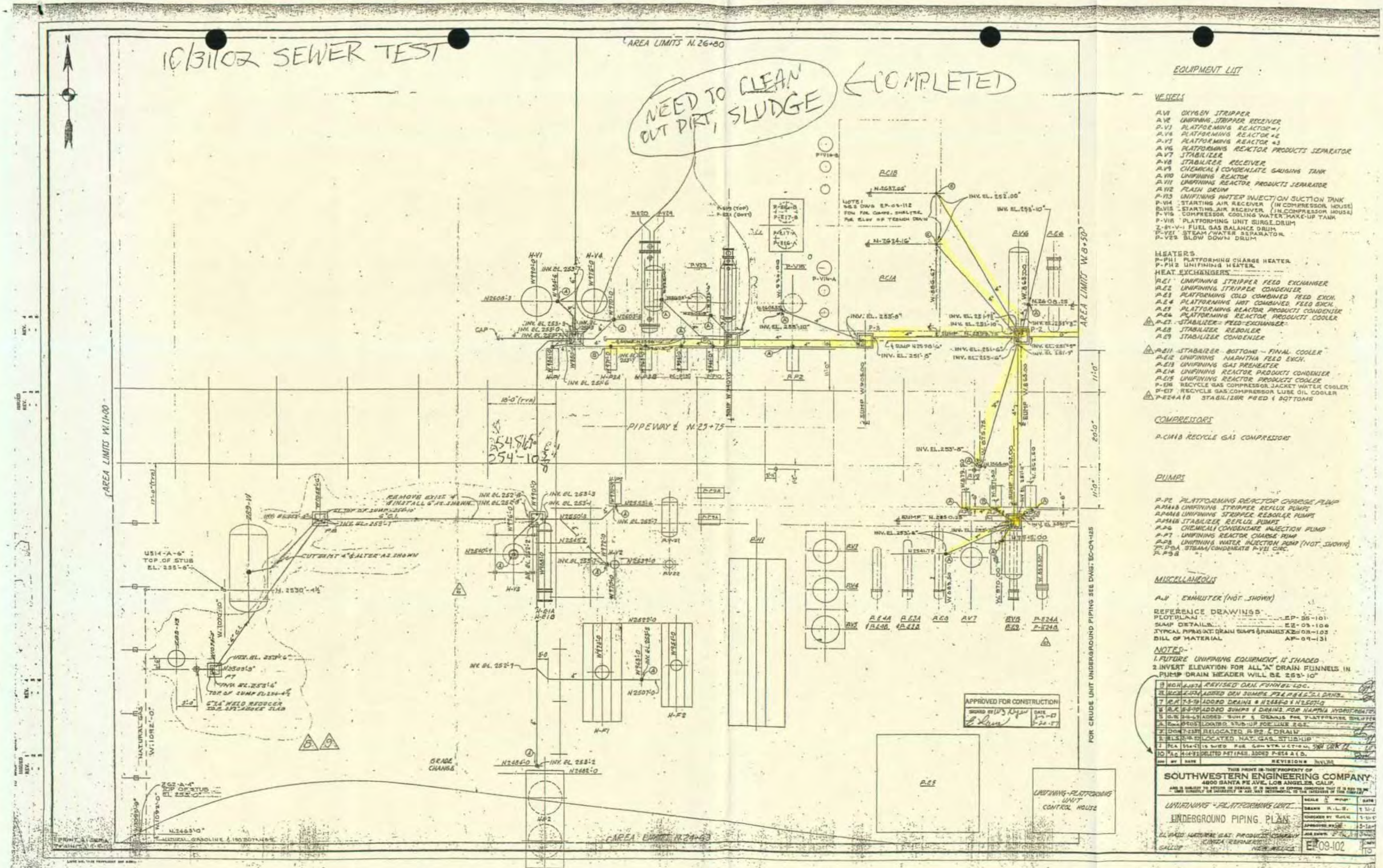
Estimated Duration 8.00
Remaining Duration
Crew
Interruptible?

Responsibility

Supervisor RAYM
Labor Group
Lead Craft/Person

Modified

By SYSADM
Date 2002-11-14-8.3


10/31/02 SEWER TEST
NEED TO CLEAN OUT DIRT, SLUDGE
← COMPLETED
AREA LIMITS N. 26+80
AREA LIMITS W. 8+50
AREA LIMITS W. 11+00
PIPEWAY ℄ N. 25+75
FOR CRUDE UNIT UNDERGROUND PIPING SEE DWG. EC-09-125
UNIFINING-PLATFORMING UNIT CONTROL HOUSE
NATURAL GAS
GRADE CHANGE
APPROVED FOR CONSTRUCTION
EQUIPMENT LIST
VESSELS
P-V1 OXYGEN STRIPPER
P-V2 UNIFINING STRIPPER RECEIVER
P-V3 PLATFORMING REACTOR #1
P-V4 PLATFORMING REACTOR #2
P-V5 PLATFORMING REACTOR #3
P-V6 PLATFORMING REACTOR PRODUCTS SEPARATOR
P-V7 STABILIZER
P-V8 STABILIZER RECEIVER
P-V9 CHEMICAL & CONDENSATE GAUGING TANK
P-V10 UNIFINING REACTOR
P-V11 UNIFINING REACTOR PRODUCTS SEPARATOR
P-V12 FLASH DRUM
P-V13 UNIFINING WATER INJECTION SUCTION TANK
P-V14 STARTING AIR RECEIVER (IN COMPRESSOR HOUSE)
P-V15 STARTING AIR RECEIVER (IN COMPRESSOR HOUSE)
P-V16 COMPRESSOR COOLING WATER MAKE-UP TANK
P-V18 PLATFORMING UNIT SURGE DRUM
Z-81-V-1 FUEL GAS BALANCE DRUM
P-V21 STEAM/WATER SEPARATOR
P-V22 BLOW DOWN DRUM
HEATERS
P-PH1 PLATFORMING CHARGE HEATER
P-PH2 UNIFINING HEATER
HEAT EXCHANGERS
P-E1 UNIFINING STRIPPER FEED EXCHANGER
P-E2 UNIFINING STRIPPER CONDENSER
P-E3 PLATFORMING COLD COMBINED FEED EXCH.
P-E4 PLATFORMING HOT COMBINED FEED EXCH.
P-E5 PLATFORMING REACTOR PRODUCTS CONDENSER
P-E6 PLATFORMING REACTOR PRODUCTS COOLER
P-E7 STABILIZER FEED EXCHANGER
P-E8 STABILIZER REBOILER
P-E9 STABILIZER CONDENSER
P-E11 STABILIZER BOTTOMS – FINAL COOLER
P-E12 UNIFINING NAPHTHA FEED EXCH.
P-E13 UNIFINING GAS PREHEATER
P-E14 UNIFINING REACTOR PRODUCTS CONDENSER
P-E15 UNIFINING REACTOR PRODUCTS COOLER
P-E16 RECYCLE GAS COMPRESSOR JACKET WATER COOLER
P-E17 RECYCLE GAS COMPRESSOR LUBE OIL COOLER
P-E24A&B STABILIZER FEED & BOTTOMS
COMPRESSORS
P-CM1&B RECYCLE GAS COMPRESSORS
PUMPS
P-P2 PLATFORMING REACTOR CHARGE PUMP
P-P3A&B UNIFINING STRIPPER REFLUX PUMPS
P-P4A&B UNIFINING STRIPPER REBOILER PUMPS
P-P5A&B STABILIZER REFLUX PUMPS
P-P6 CHEMICAL & CONDENSATE INJECTION PUMP
P-P7 UNIFINING REACTOR CHARGE PUMP
P-P8 UNIFINING WATER INJECTION PUMP (NOT SHOWN)
P-P9A STEAM/CONDENSATE P-V21 CIRC.
P-P9B
MISCELLANEOUS
P-J1 EXHAUSTER (NOT SHOWN)
REFERENCE DRAWINGS
PLOT PLAN EP-35-101
SUMP DETAILS EZ-03-106
TYPICAL PIPING AT DRAIN SUMPS & FUNNELS AZ-03-103
BILL OF MATERIAL AP-09-131
NOTES:-
1. FUTURE UNIFINING EQUIPMENT IS SHADED
2. INVERT ELEVATION FOR ALL "A" DRAIN FUNNELS IN PUMP DRAIN HEADER WILL BE 253'-10"
9 REVISED DRN. FUNNEL LOC.
8 ADDED DRN SUMPS
7 R.R. 7-3-70 ADDED DRAINS @ N2484-0 & N2507-0
6 R.R. ADDED SUMPS & DRAINS FOR NAPTHA HYDROTREATER
5 ADDED SUMP & DRAINS FOR PLATFORMER STRIPPER
4 LOCATED STUB-UP FOR LINE
3 RELOCATED P-P2 & DRAIN
2 R.L.S. LOCATED NAT. GAS STUB-UP
1 ISSUED FOR CONSTRUCTION
10 DELETED P-E7 & P-E11, ADDED P-E24 A & B.
NO. BY DATE REVISIONS
THIS PRINT IS THE PROPERTY OF
SOUTHWESTERN ENGINEERING COMPANY
4800 SANTA FE AVE., LOS ANGELES, CALIF.
UNIFINING - PLATFORMING UNIT
UNDERGROUND PIPING PLAN
EL PASO NATURAL GAS PRODUCTS COMPANY
CIBOLA REFINERY
GALLUP NEW MEXICO
SCALE
DRAWN R.L.S.
CHECKED BY
APPROVED BY
JOB
E-09-102

GIANT REFINING COMPANY

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Crude
Test Fluid:	Water
Test Water Column (ft.):	4 +
Test Duration (min.):	30
Manhole Number:	C-1, C-2, C-3, C-4, C-5, & C-10
Date:	10/31/02

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

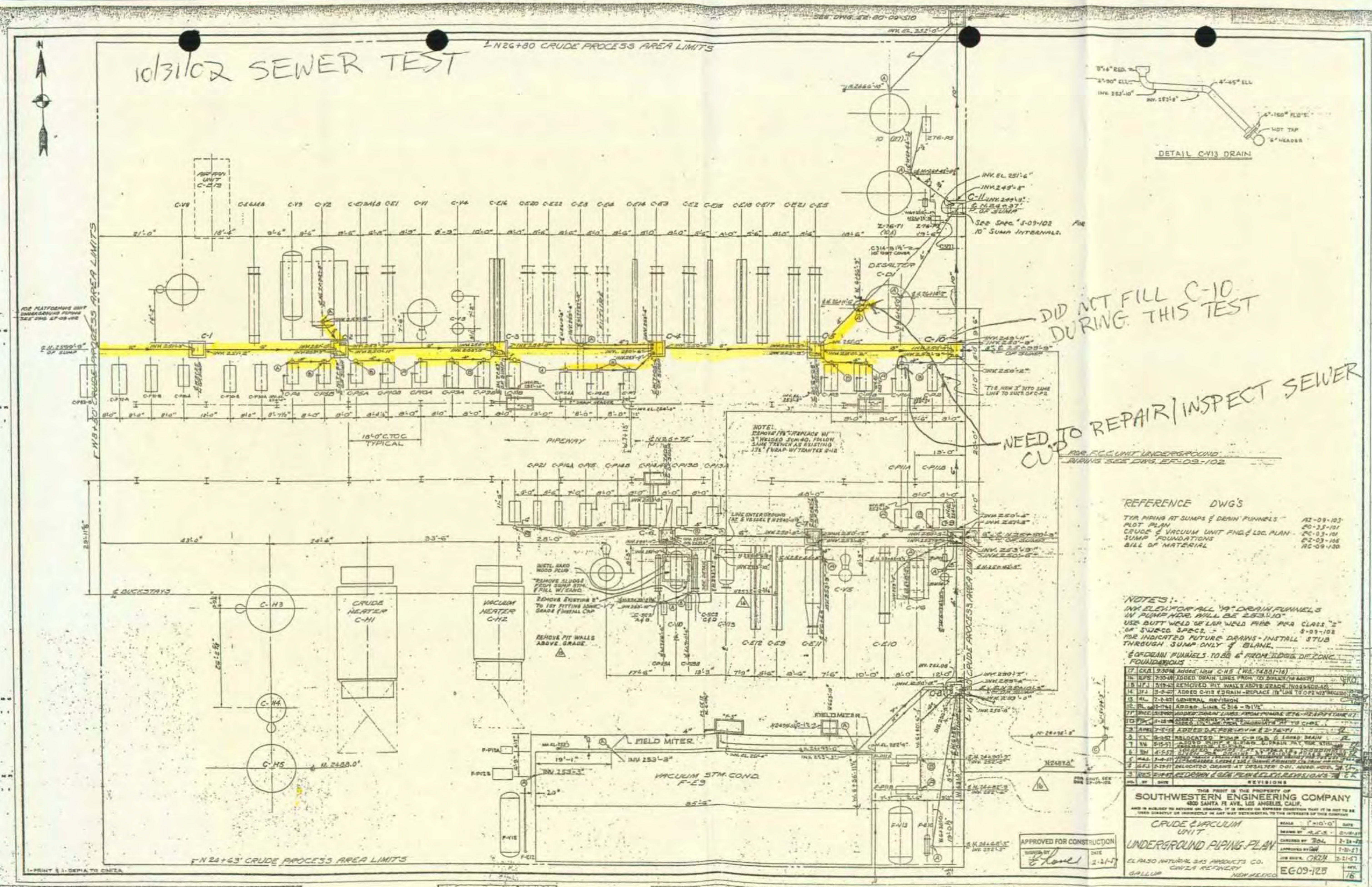
Yes No

List any branch lines and location of branch lines that did not hold level (if any):
Sewer cups near C-P1A, & C-PV109 did not hold level. All other sewer cups and branch lines did hold level. A work ticket has been entered to repair the two sewer cups listed above.

Test Witness Signature: B. Todd

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301


10/31/02 SEWER TEST
DID NOT FILL C-10 DURING THIS TEST
NEED TO REPAIR / INSPECT SEWER
℄ N26+80 CRUDE PROCESS AREA LIMITS
℄ N24+63 CRUDE PROCESS AREA LIMITS
CRUDE PROCESS AREA LIMITS
PIPEWAY
18'-0" C TO C TYPICAL
CRUDE HEATER C-H1
VACUUM HEATER C-H2
C-H3
C-H4
C-H5
VACUUM STM. COND. F-E9
FIELD MITER
FIELD MITER
DESALTER C-D1
DETAIL C-V13 DRAIN
FOR F.C.C. UNIT UNDERGROUND PIPING SEE DWG. EF-09-102
REFERENCE DWG'S
TYP. PIPING AT SUMPS & DRAIN FUNNELS AZ-09-103
PLOT PLAN EC-33-101
CRUDE & VACUUM UNIT FND. & LOC. PLAN EC-03-101
SUMP FOUNDATIONS EZ-03-106
BILL OF MATERIAL AC-09-130
NOTES:-
INV. ELEV. FOR ALL "A" DRAIN FUNNELS IN PUMP HDR. WILL BE 253'-10"
USE BUTT WELD OR LAP WELD PIPE PER CLASS "I" OF SWECO SPECS. S-09-102
FOR INDICATED FUTURE DRAINS - INSTALL STUB THROUGH SUMP ONLY & BLANK.
℄ OF DRAIN FUNNELS TO BE 6" FROM EDGE OF CONC. FOUNDATIONS
17 CKB 9-30-96 Added New C-H5 (W.O. 74881-76)
16 EPS 7-30-69 ADDED DRAIN LINES FROM CO BOILER
15 JFJ 5-19-67 REMOVED PIT WALLS ABOVE GRADE
14 JFJ 3-2-67 ADDED C-V13 & DRAIN - REPLACE 1½" LINE TO C-P2 W/3"
13 RL 2-7-67 GENERAL REVISION
12 RL ADDED LINE C314 - 1½"
3 REDRAWN & GEN. PLAN & ELEV. REVISIONS
REVISIONS
THIS PRINT IS THE PROPERTY OF
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CRUDE & VACUUM UNIT
UNDERGROUND PIPING PLAN
EL PASO NATURAL GAS PRODUCTS CO.
CIRIZA REFINERY
GALLUP NEW MEXICO
SCALE 1" = 10'-0"
EG09-125
16
APPROVED FOR CONSTRUCTION

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	FCC
Test Fluid:	Water
Test Water Column (ft.):	7
Test Duration (min.):	25
Manhole Number:	F4
Date:	1/11/02

Test Data for Branch Lines from the Listed Manhole

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

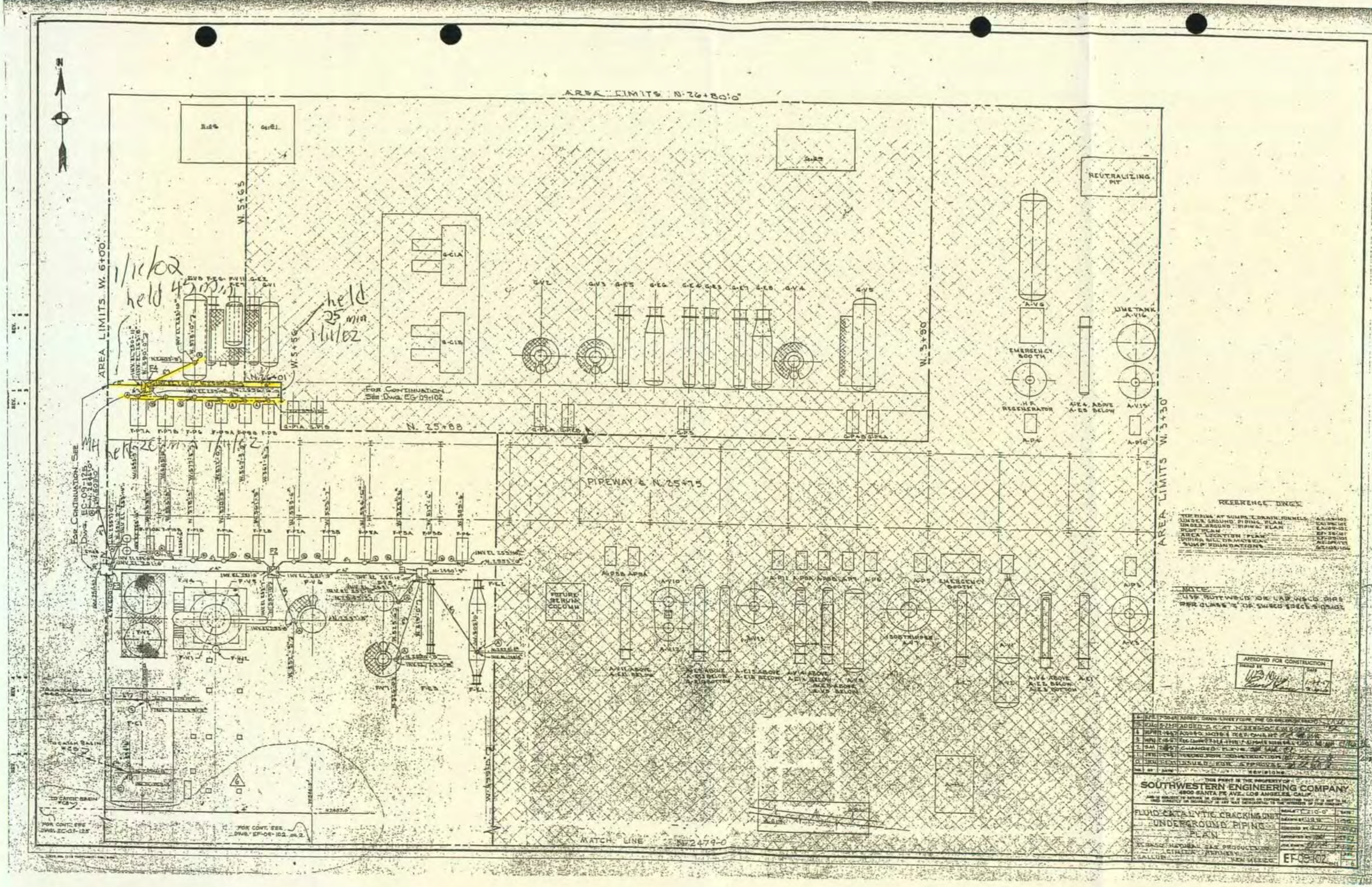
Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any).

N.A.

Test Witness Signature: B. Noon


AREA LIMITS N. 26+80'0"
AREA LIMITS W. 6+00'
AREA LIMITS W. 3+30'
W. 5+65
W. 3+30
NEUTRALIZING PIT
FOR CONTINUATION SEE DWG. EG-09-102
N. 25+88
PIPEWAY & N. 25+75
EMERGENCY BOOTH
LIME TANK A-V16
REGENERATOR
FUTURE REBOILER COLUMN
REFERENCE DWGS.
NOTE:
MATCH LINE N. 24+79'-0"
FOR CONTINUATION SEE DWG. EG-09-125
FOR CONT. SEE DWG. EF-09-102 SH. 2
1/11/02 held 45 min
held 25 min 1/11/02
MH held 20 min 1/11/02
APPROVED FOR CONSTRUCTION
ISSUED FOR APPROVAL
REVISIONS
THIS PRINT IS THE PROPERTY OF
SOUTHWESTERN ENGINEERING COMPANY
4800 SANTA FE AVE., LOS ANGELES, CALIF.
FLUID CATALYTIC CRACKING UNIT
UNDERGROUND PIPING
PLAN
EL PASO NATURAL GAS PRODUCTS CO.
CIRCLE REFINERY
GALLUP NEW MEXICO
EF-09-102

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Gas Con
Test Fluid:	Water
Test Water Column (ft.):	4
Test Duration (min.):	70
Manhole Number:	G1 & G2
Date:	1/9/02

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any).
N.A.

Test Witness Signature: B. Looe

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Gas Con
Test Fluid:	Water
Test Water Column (ft.):	7
Test Duration (min.):	45
Manhole Number:	G3
Date:	1/10/02

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any).
Branch lines have not been tested yet.

Test Witness Signature: B. Loos

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Gas Con
Test Fluid:	Water
Test Water Column (ft.):	7
Test Duration (min.):	25
Manhole Number:	G4
Date:	1/11/02

Test Data for Branch Lines from the Listed Manhole

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

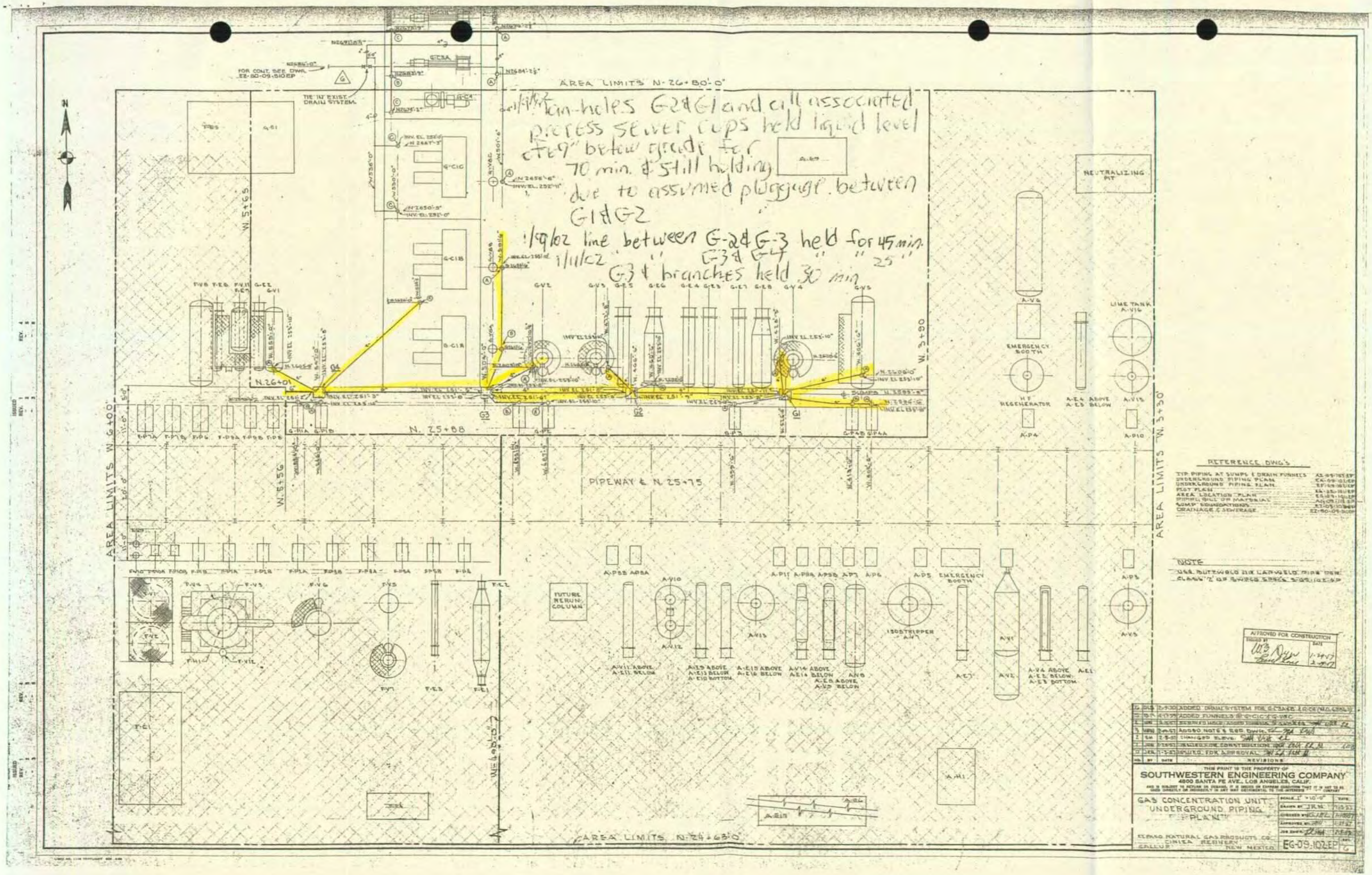
Yes No

Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any).

Test Witness Signature: B. Koos


AREA LIMITS N-26+80'-0"
Man-holes G2&G1 and all associated process sewer cups held liquid level @ 9" below grade for 70 min. & still holding due to assumed pluggage between G1&G2
1/9/02 line between G-2&G-3 held for 45 min.
1/11/02 " " G-3&G-4 " " 25 "
G3 & branches held 30 min
NEUTRALIZING PIT
EMERGENCY BOOTH
LIME TANK A-V16
H F REGENERATOR
N. 25+88
G3
G2
G1
G4
PIPEWAY ℄ N. 25+75
AREA LIMITS W. 6+00
AREA LIMITS W. 3+30
W. 5+65
W. 5+56
W. 3+90
FUTURE RERUN COLUMN
ISOSTRIPPER
REFERENCE DWG'S
NOTE
APPROVED FOR CONSTRUCTION
AREA LIMITS N-24+63'-0"
ADDED DRAIN SYSTEM FOR G-C3A&B
ADDED FUNNELS @ G-C1C & G-V8C
ADDED NOTE & REF. DWG.
CHANGED ELEVS.
ISSUED FOR CONSTRUCTION
ISSUED FOR APPROVAL
NO. BY DATE REVISIONS
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4800 SANTA FE AVE., LOS ANGELES, CALIF.
GAS CONCENTRATION UNIT
UNDERGROUND PIPING
PLAN
EL PASO NATURAL GAS PRODUCTS CO.
CINIZA REFINERY
GALLUP NEW MEXICO
SCALE 1" = 10'-0"
EG-09-102-EP
6

GIANT
REFINING COMPANY

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Crude
Test Fluid:	Water
Test Water Column (ft.):	4
Test Duration (min.):	25
Manhole Number:	C8 & C9
Date:	7/31/02

Test Data for Branch Lines from the Listed Manhole

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any):
Sewer cup at C-P11, debutanizer reflux pump foundation.

Test Witness Signature: B. Loos

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

WO46749 - Repair sewer cup at C-P11, debutanizer reflux pump, foundation

Equipment: -
Location: 10-CRUDE
Job Plan: -
Parts reserved in warehouse:

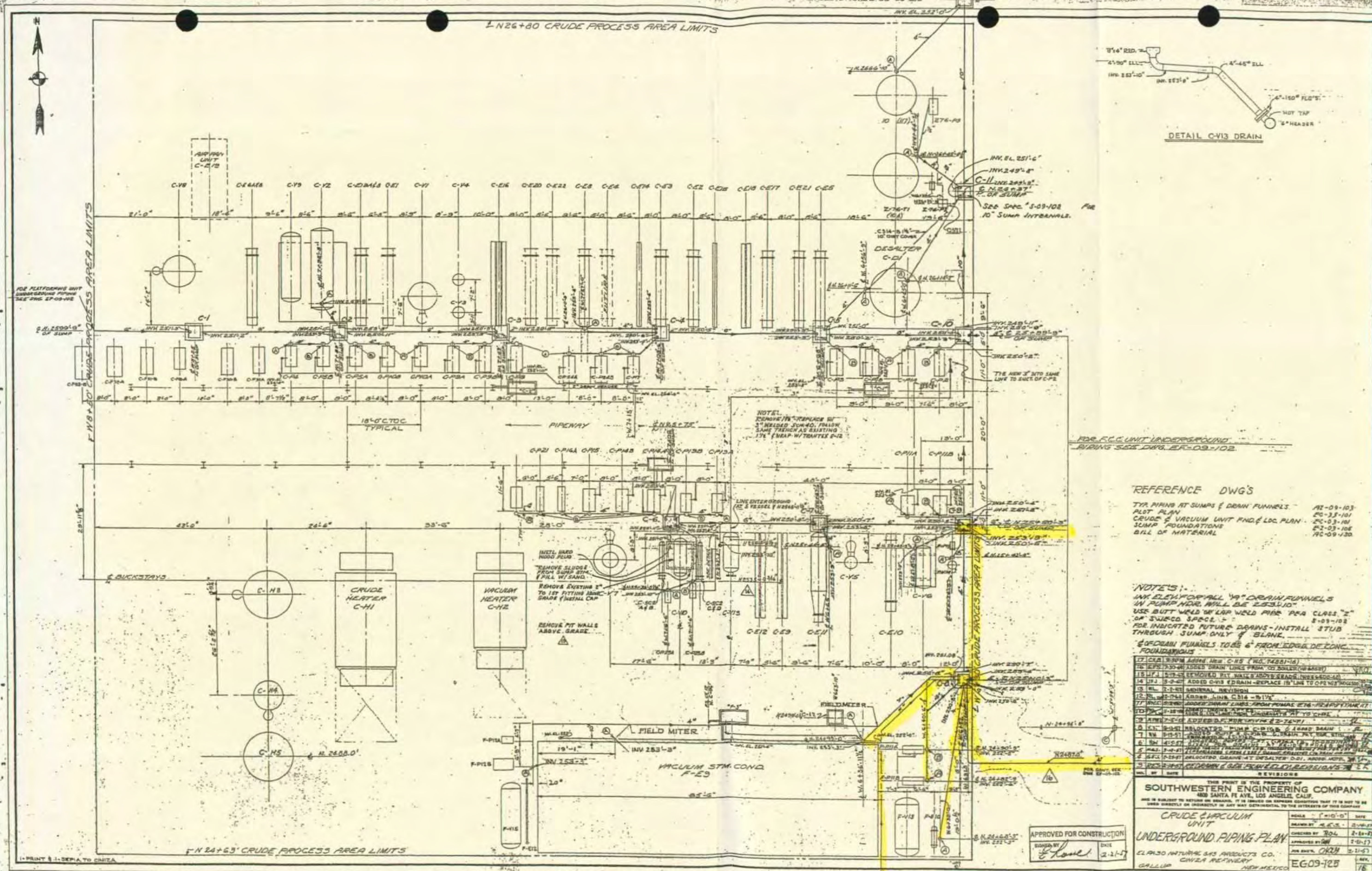
Comments:

Status: CLOSE
Report Date: 8/5/2002
Start Date: 10/23/2002
Finish Date: 10/23/2002
Parent:
Sequence: 0.00
Reported By: BLOOS
Lead Craft:
Priority: 3.00

Failure Report:

JPOPERATION	DESCRIPTION	DURATION

DATE:_____ START:_____ FINISH: _____
DATE:_____ START:_____ FINISH: _____
DATE:_____ START:_____ FINISH: _____
DATE:_____ START:_____ FINISH: _____ OPERATOR: _____
DATE COMPLETED:_____ COMPLETED BY: _____ SUPERVISOR:_____



N26+80 CRUDE PROCESS AREA LIMITS
N24+63' CRUDE PROCESS AREA LIMITS
W8+20' CRUDE PROCESS AREA LIMITS
DETAIL C-V13 DRAIN
PIPEWAY
CRUDE HEATER C-H1
VACUUM HEATER C-H2
DESALTER C-D1
FIELD MITER
VACUUM STM. COND. F-E9
FOR F.C.C. UNIT UNDERGROUND PIPING SEE DWG. EF-09-102
REFERENCE DWG'S
TYP. PIPING AT SUMPS & DRAIN FUNNELS AZ-09-103
PLOT PLAN EC-35-101
CRUDE & VACUUM UNIT FND. & LOC. PLAN EC-03-101
SUMP FOUNDATIONS EZ-03-105
BILL OF MATERIAL AC-09-130
NOTES:-
INV. ELEV. FOR ALL "A" DRAIN FUNNELS IN PUMP HDR. WILL BE 253'-10"
USE BUTT WELD OR LAP WELD PIPE PER CLASS "Z" OF SWECO SPECS. E-09-102
FOR INDICATED FUTURE DRAINS - INSTALL STUB THROUGH SUMP ONLY & BLANK.
CL OF DRAIN FUNNELS TO BE 6" FROM EDGE OF CONC. FOUNDATIONS
REVISIONS
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4800 SANTA FE AVE., LOS ANGELES, CALIF.
CRUDE & VACUUM UNIT
UNDERGROUND PIPING PLAN
EL PASO NATURAL GAS PRODUCTS CO.
CINIZA REFINERY
GALLUP NEW MEXICO
SCALE 1"=10'-0"
EG09-125
REV. 16
APPROVED FOR CONSTRUCTION
DATE 2-21-57

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	FCC
Test Fluid:	Water
Test Water Column (ft.):	4
Test Duration (min.):	25
Manhole Number:	F1, F2, F3
Date:	7/31/02

Test Data for Branch Lines from the Listed Manhole

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

Yes No

List any branch lines and location of branch lines that did not hold level (if any).

Test Witness Signature: B. Loos

REFERENCE DWGS.

[illegible]	[illegible]
UNDERGROUND PIPING PLAN	[illegible]
UNDERGROUND PIPING PLAN	[illegible]
PLOT PLAN	[illegible]
AREA LOCATION PLAN	[illegible]
PIPING BILL OF MATERIAL	[illegible]
SUMP FOUNDATIONS	[illegible]

NOTE:
1. USE BUTTWELD OR LAP WELD PIPE PER CLASS [illegible] OF SWECO SPECS [illegible]

APPROVED FOR CONSTRUCTION

SIGNED BY	DATE
	1-17-57

NO.	BY	DATE	REVISIONS
6	SPS	7-30-69	ADDED DRAIN LINES FROM [illegible]
5	[illegible]	5-7-57	ADDED C.O. AT [illegible]
4	[illegible]	[illegible]-1957	ADDED NOTE & REF. DWG. NO.
3	[illegible]	2-16-57	[illegible]
2	[illegible]	[illegible]	CHANGED ELEVS.
1	[illegible]	[illegible]	ISSUED FOR CONSTRUCTION
0	[illegible]	[illegible]	ISSUED FOR APPROVAL

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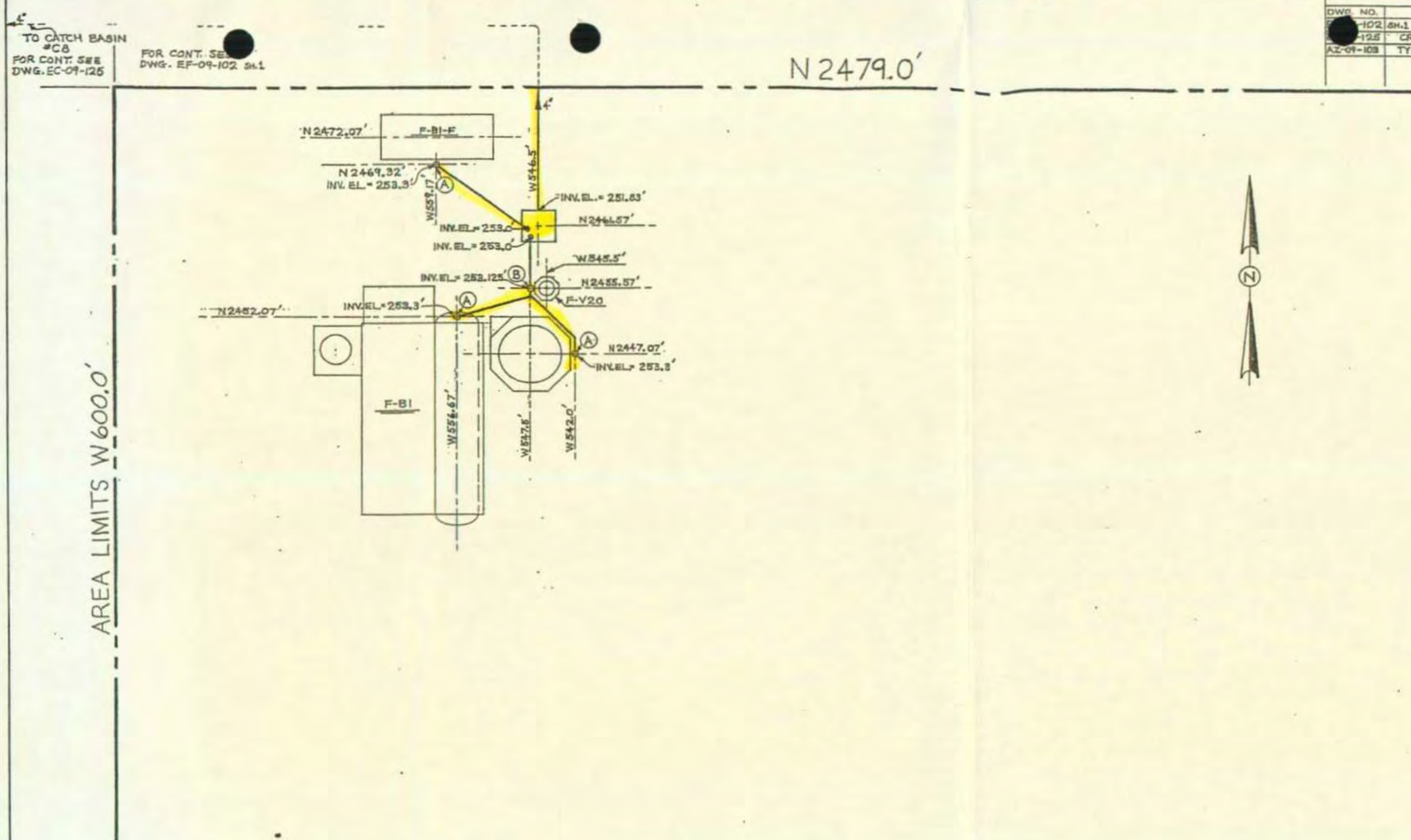
FLUID CATALYTIC CRACKING UNIT
UNDERGROUND PIPING
PLAN

EL PASO NATURAL GAS PRODUCTS CO.
CIRCLE REFINERY
GALLUP NEW MEXICO

SCALE 1" = 10'-0"	DATE
DRAWN BY [illegible]	[illegible]
CHECKED BY [illegible]	[illegible]
APPROVED BY [illegible]	[illegible]
JOB ENGR. [illegible]	[illegible]

EF-09-102 REV. 6

REFERENCE DRAWINGS	
DWG. NO.	DESCRIPTION
-102	SH.1 F.C.C. UNIT UNDERGROUND PIPING
-125	CRUDE UNIT UNDERGROUND PIPING
AZ-09-103	TYPICAL PIPING AT SUMPS & FUNNELS



MARK	DATE	DESCRIPTION	BY	APRVD
REVISIONS				

SHELL OIL COMPANY
CINIZA REFINERY GALLUP, N. M.

FLUID CATALYTIC CRACKING UNIT UNDERGROUND PIPING PLAN

SCALE 1" = 10'	APRVD J. M. A.
DATE 8-1-69	APRVD
DRWN EFS	
	EF-09-102

W. O. NO. 68539

GIANT REFINING COMPANY

Ciniza Refinery Sewer Test Form

Test Data for Main Line Upstream of Listed Manhole

Unit:	Plat
Test Fluid:	Water
Test Water Column (ft.):	3 +_(in manholes, 1-3 from sewer pipe inverts connecting manholes)
Test Duration (min.):	25
Manhole Number:	P-8, P-5, P-6, & P-7
Date:	1/23/03

Were all process sewer cup branches from the above manholes filled with water to verify that branch lines held level?

Yes No

Did all branch lines hold level?

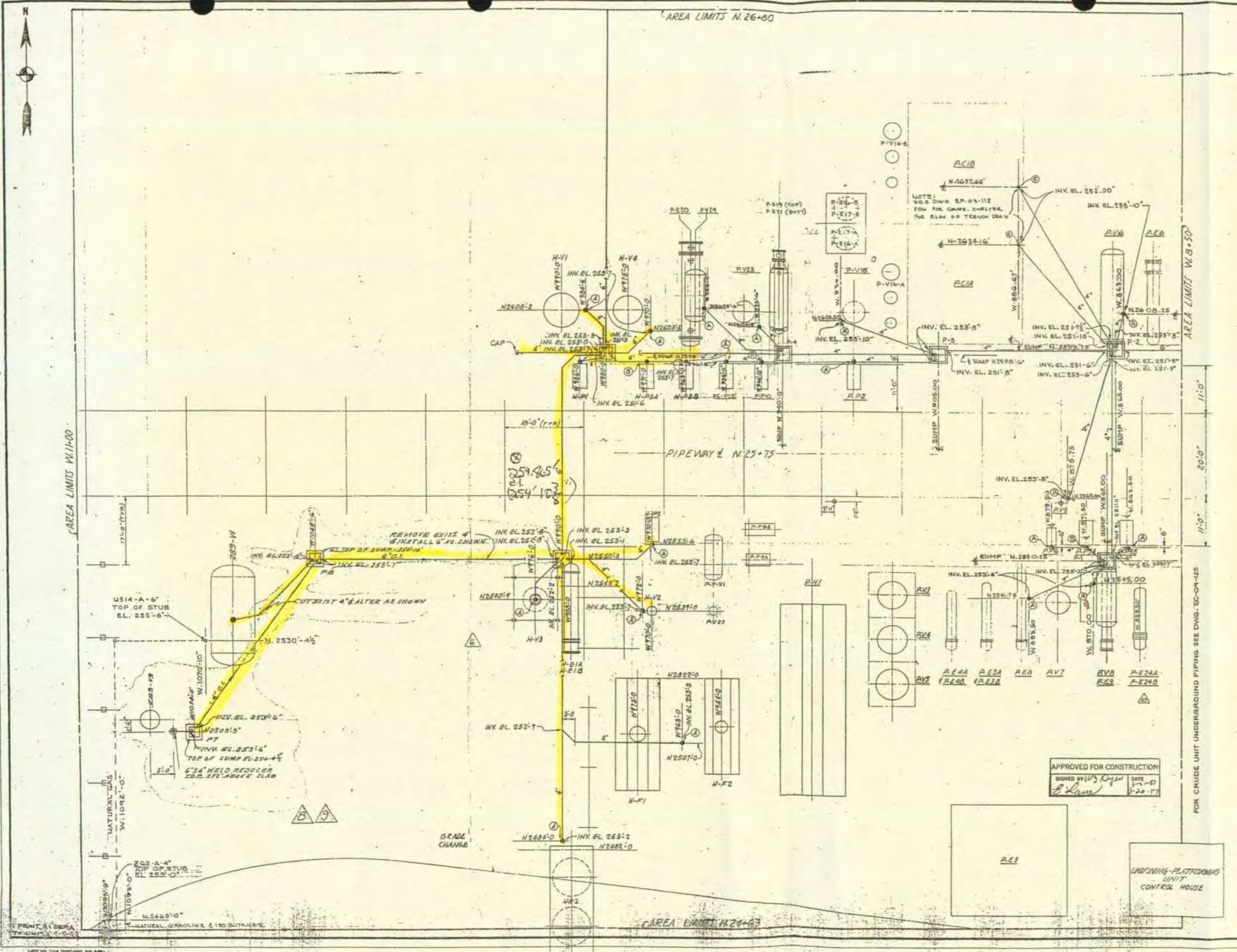
Yes No

List any branch lines and location of branch lines that did not hold level (if any):
Sewer cup by P-V3. A work order has been written to repair this item.

Test Witness Signature: B Todd

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301



EQUIPMENT LIST

VESSELS

P-V1 OXYGEN STRIPPER
P-V2 UNIFINING STRIPPER RECEIVER
P-V3 PLATFORMING REACTOR #1
P-V4 PLATFORMING REACTOR #2
P-V5 PLATFORMING REACTOR #3
P-V6 PLATFORMING REACTOR PRODUCTS SEPARATOR
P-V7 STABILIZER
P-V8 STABILIZER RECEIVER
P-V9 CHEMICAL & CONDENSATE GAUGING TANK
P-V10 UNIFINING REACTOR
P-V11 UNIFINING REACTOR PRODUCTS SEPARATOR
P-V12 FLASH DRUM
P-V13 UNIFINING WATER INJECTION SUCTION TANK
P-V14 STARTING AIR RECEIVER (IN COMPRESSOR HOUSE)
P-V15 STARTING AIR RECEIVER (IN COMPRESSOR HOUSE)
P-V16 COMPRESSOR COOLING WATER MAKE-UP TANK
P-V18 PLATFORMING UNIT SURGE DRUM
Z-84-V-1 FUEL GAS BALANCE DRUM
P-V21 STEAM/WATER SEPARATOR
P-V22 BLOW DOWN DRUM

HEATERS

P-PH1 PLATFORMING CHARGE HEATER
P-PH2 UNIFINING HEATER

HEAT EXCHANGERS

P-E1 UNIFINING STRIPPER FEED EXCHANGER
P-E2 UNIFINING STRIPPER CONDENSER
P-E3 PLATFORMING COLD COMBINED FEED EXCH.
P-E4 PLATFORMING HOT COMBINED FEED EXCH.
P-E5 PLATFORMING REACTOR PRODUCTS CONDENSER
P-E6 PLATFORMING REACTOR PRODUCTS COOLER
P-E7 STABILIZER FEED EXCHANGER
P-E8 STABILIZER REBOILER
P-E9 STABILIZER CONDENSER

P-E11 STABILIZER BOTTOMS - FINAL COOLER
P-E12 UNIFINING NAPHTHA FEED EXCH.
P-E13 UNIFINING GAS PREHEATER
P-E14 UNIFINING REACTOR PRODUCTS CONDENSER
P-E15 UNIFINING REACTOR PRODUCTS COOLER
P-E16 RECYCLE GAS COMPRESSOR JACKET WATER COOLER
P-E17 RECYCLE GAS COMPRESSOR LUBE OIL COOLER
P-E24A&B STABILIZER FEED & BOTTOMS

COMPRESSORS

P-C1A&B RECYCLE GAS COMPRESSORS

PUMPS

P-P2 PLATFORMING REACTOR CHARGE PUMP
P-P3A&B UNIFINING STRIPPER REFLUX PUMPS
P-P4A&B UNIFINING STRIPPER REBOILER PUMPS
P-P5A&B STABILIZER REFLUX PUMPS
P-P6 CHEMICAL & CONDENSATE INJECTION PUMP
P-P7 UNIFINING REACTOR CHARGE PUMP
P-P8 UNIFINING WATER INJECTION PUMP (NOT SHOWN)
P-P9A STEAM/CONDENSATE P-V21 CIRC.
P-P9B "

MISCELLANEOUS

P-J1 EXHAUSTER (NOT SHOWN)

REFERENCE DRAWINGS
PLOTPLAN EP-35-101
SUMP DETAILS EZ-03-106
TYPICAL PIPING AT DRAIN SUMPS & FUNNELS AZ-09-103
BILL OF MATERIAL AP-09-131

NOTES:-
1. FUTURE UNIFINING EQUIPMENT IS SHADED
2. INVERT ELEVATION FOR ALL "A" DRAIN FUNNELS IN PUMP DRAIN HEADER WILL BE 253'-10"

NO.	BY	DATE	REVISIONS
9	H.C.H.	4-15-74	REVISED DRN. FUNNEL LOC.
8	H.C.H.	4-1-74	ADDED DRN SUMPS P3 & P8 & 6" C.I. DRNS.
7	R.F.	7-3-70	ADDED DRAINS @ N2484-0 & N2507-0
6	R.R.	5-5-70	ADDED SUMPS & DRAINS FOR NAPTHA HYDROTREATER
5	D.H.	2-11-69	ADDED SUMP & DRAINS FOR PLATFORMER STRIPPER
4			LOCATED STUB-UP FOR LINE 2G2.
3	DON	7-23-57	RELOCATED P-P2 & DRAIN
2	RLS		LOCATED NAT. GAS STUB-UP
1	PCA		ISSUED FOR CONSTRUCTION
10		4-14-81	DELETED P-E7 & P-E11. ADDED P-E24 A & B.

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UNIFINING - PLATFORMING UNIT
UNDERGROUND PIPING PLAN
EL PASO NATURAL GAS PRODUCTS COMPANY
CINIZA REFINERY
GALLUP NEW MEXICO

DRAWN R.L.S.
EP-09-102

WO49101 - Repair Sewer cup at P-V3 and/or branch line.

Equipment: -
Location: 13_SEWER
Job Plan: -
Parts reserved in warehouse:
Comments:

Status: CLOSE
Report Date: 2/3/2003
Start Date: 2/6/2003
Finish Date: 2/7/2003
Parent:
Sequence: 0.00
Reported By: BLOOS
Lead Craft:
Priority: 3.00

Failure Report:

JPOPERATION	DESCRIPTION	DURATION

DATE:_____ START:_____ FINISH: _____
DATE:_____ START:_____ FINISH: _____
DATE:_____ START:_____ FINISH: _____
DATE:_____ START:_____ FINISH: _____ OPERATOR: _____
DATE COMPLETED:_____ COMPLETED BY: _____ SUPERVISOR:_____

CINIZA REFINERY SITE MAP

Color coded 2/14/03 Manecini

PRECISION ENGINEERING, INC.

DRAWN BY: GW

SWMU 1 - Aeration basin
SWMU 2 - Evaporation Ponds
SWMU 3 - Empty Cobntainer Storage Area
SWMU 4 - Old Burn Pit
SWMU 5 - Land Fill Area
SWMU 6 - Tank Farm
SWMU 7 - Fire Training Area
SWMU 8 - Railroad Rock Lagoon
SWMU 9 - Drainage Ditch Near Inactive Land Farm
SWMU 10 - Sludge Pits
SWMU 11 - Secondary Oil Skimmer
SWMU 12 - Contact Waste Water Collection System
SWMU 13 - Drainage Ditch Between API Evaporation Ponds and Neutralization Tank Evaporation Ponds

EXIT 39
EAST I-40
WEST I-40

SWMU 2
SWMU 11
SWMU 10
SWMU 6
SWMU 3
SWMU 13
SWMU 1
SWMU 12
SWMU 5
SWMU 7
SWMU 4
SWMU 9
SWMU 8

LAND TREATMENT AREA
OCD LTA
INACTIVE LTA
RAIL ROAD LAGOONS
SWMU NO. 1 & AERATION LAGOONS
HYDROGEN TANKS

5000' W
4500' W
4000' W
3500' W
3000' W
2500' W
2000' W
1500' W
1000' W
500' W

0.00' S
500' N
1000' N
1500' N
2000' N
2500' N
3000' N
3500' N
4000' N
4500' N
5000' N
5500' N
6000' N
6500' N

89° 57' 30"
90° 02' 30"

MARKED ROCK IN ROCK MOUND
SE CORNER OF SECTION 33, T15N, R15W
0.00' W

N. 6589.30'
W. 0.00'
2" IP SET IN CONCRETE, NE CORNER OF PROPERTY

COLOR CODE: SONSELA WELLS
CHINLE/ALLUVIUM INTERFACE WELLS
UPPER SAND WELLS
ALL OTHER EXPLORATORY BORINGS

1" = 300'

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6929.2
TOTAL DEPTH: 35.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 21.2'
BORING ID: 0656
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.0	***//oo**		C	SAND, FINE, CLAYEY, FINE GRAVEL, BROWN, MOIST	0.0-23.0
1.0	***//oo**		C		0
1.0-4.5	///**oo//		C	CLAY, SLIGHTLY SANDY, SOME FINE GRAVEL, MOIST, RED BROWN, FIRM TO SOFT, NO ODOR,	
	///**oo//		C	SOME CHARCOALING	
	///**oo//		C		
	///**oo//		C		
	///**oo//		C	MORE GRAVELLY AT 3.5' TO 3.8'	
	///**oo//		C		
4.5	///**oo//		C		
4.5-4.8	****//***	5.0	C	SAND, FINE, DAMP, SLIGHTLY CLAYEY, PURPLISH BROWN, NO ODOR	
4.8-6.0	///***--/		C	CLAY, VERY SANDY, FINE, SILTY, NO ODOR, PURPLISH BROWN	
6.0	///***--/		C		
6.0-6.2	***//-***		C	SAND, FINE TO MEDIUM, CLAYEY, SLIGHTLY SILTY, MOIST, PURPLE RED, NO ODOR	
6.2-7.8	//***-+//		C	CLAY, VERY SANDY, FINE, SILTY, SOME CALCAREOUSLY INDURATED APPEARING NODULES, FINE	
	//***-+//		C	GRAVEL, SOME VEGETATION IN SAMPLE, DAMP TO MOIST, PURPLISH BROWN	
7.8	//***-+//		C		
7.8-8.5	***//-***		C	SAND, VERY FINE TO FINE, CLAYEY, SILTY, SOME CEMENTED SAND, MOIST, PURPLISH BROWN,	
8.5-8.8	///***///		C	CLAY, SAND, FINE, SAND APPEARS TO BE IN BANDS, NO ODOR, FIRM, MOIST	
8.8-9.2	***///***		C	SAND, FINE, CLAYEY, MOIST, PURPLISH BROWN, SLIGHT ORANGE TINT AT 8.8'	
9.2-11.5	///***///	10	C	CLAY, SANDY, FINE, SOME CHARCOALING AND GYPSUM SPOTS IN SAMPLE, MOIST, SOME ROOT	
	///***///		C	MATTER, HARD, NO ODOR	
	///***///		C		
	///***///		C		
11.5-12.2	///***///		C	CLAY, MOIST, HARD, SLIGHTLY SILTY, HEAVY CHARCOALING, VEGETATION, CALCAREOUS	
12.2	///***///		C	INDURATION OR GYPSUM NODULES, NO ODOR, PURPLISH BROWN	
12.2-14.2	***///***		C	INTERBEDDED SAND AND CLAY	
	///***///		C		
14.2	***///***		C		
14.2-17.0	///****//		C	CLAY, MOIST, PURPLISH BROWN, VERY SANDY, ORANGE SANDY BANDS IN CLAY, VERY THIN	
	///****//	15	C	LAYERS TO 15', NO ODOR, SOME CHARCOALING	
	///****//		C		
	///****//		C		
	///****//		C		
17.0	///****//		C		
17.0-17.5	***//-***		C	SAND, CLAYEY, SILTY, FINE, PURPLISH BROWN WITH ORANGE TINT, NO ODOR	
17.5-18.2	///--*///		C	CLAY, SILTY, SANDY, WET, PURPLISH BROWN, SOFT TO FIRM, SOME VEINING, POSSIBLE ROOTS	
18.2	///--*///		C	DARK GREEN, NO ODOR	
18.2-18.8	****-/***		C	SAND, FINE TO MEDIUM, PURPLISH WITH ORANGE BANDS, SOME BLACK BANDING, SILTY,	
18.8	****-/***		C	SLIGHTLY CLAYEY, NO ODOR	
18.8-19.7	////*-///	20	C	CLAY, MOIST, ROOT MATTER, PURPLISH BROWN, SLIGHTLY SANDY, SOME SILT, NO ODOR	
19.7-19.9	****--***		C	SAND, FINE, MOIST, ORANGE BROWN, SLIGHTLY SILTY, SOME PURPLING, NO ODOR	
19.9-21.2	///-**///		C	CLAY, WET, SLIGHTLY SILTY, SANDY, REDDISH PURPLE, FIRM, NO ODOR	
21.2-22.0	***-//***		C	SAND, FINE, WET, SLIGHTLY WATER BEARING, ORANGE BROWN TO PURPLE, NO ODOR, SLIGHTLY	
22.0	***-//***		C	SILTY, CLAYEY, MODERATELY DENSE	
22.0-22.4	/*/*/*/*/		C	INTERBEDDED CLAY AND SAND	
22.4-27.2	///*00///		C	CLAY, MOIST, SLIGHTLY SANDY, SOME GYPSUM NODULES OR CEMENTED SAND, COARSE GRAVEL,	

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6929.2
TOTAL DEPTH: 35.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 21.2'
BORING ID: 0656
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
22.4-27.2	///*oo///		C	**CLAY**, MOIST, SLIGHTLY SANDY, SOME GYPSUM NODULES OR CEMENTED SAND, COARSE GRAVEL,	23.0-32.0
	///*oo///		C	WHITE, FINE, NO ODOR, REDDISH BROWN	0
	///*oo///		C		
	///*oo///	25	C		
	///*oo///		C		
	///*oo///		C		
	///*oo///		C		
27.2	///*oo///		C		
27.2-27.7	***/oo***		C	**SAND**, FINE TO MEDIUM, **SLIGHTLY WATER BEARING**, SLIGHTLY CLAYEY, FINE GRAVEL, REDDISH	
27.7	***/oo***		C	BROWN WITH PURPLE TINT, NO ODOR	
27.7-28.0	///--*///		C	**CLAY**, SILTY, MOIST TO WET, SLIGHTLY SANDY, RED BROWN, FIRM, NO ODOR	
28.0-28.8	oo//--**o		C	**GRAVEL**, FINE TO COARSE, CLAYEY, SILTY, SANDY, FINE, WET, SOME SANDSTONE NODULES,	
28.8	oo//--**o		C	BONE WHITE, NO ODOR	
28.8-29.0	///**oo//	30	C	**CLAY**, MOIST, SANDY, FINE GRAVEL, RED BROWN, STIFF, NO ODOR	
29.0-32.0	ooo***ooo		C	**GRAVEL**, FINE TO COARSE, SANDY, FINE TO COARSE, PURPLE BROWN, **WATER BEARING**, CLAYEY,	
	ooo***ooo		C	NO ODOR, 30.0'-32.0' MORE COARSE SAND, FINE GRAVEL, **WATER BEARING**	
	ooo***ooo		C		
32.0	ooo***ooo		C		3.0
32.0-35.0	===//*===		C	**CHINLE FORMATION**	
	===//*===		C	PURPLISH WITH LIGHT GREEN BANDING, CLAYEY, SOME SAND, FINE, SOME CEMENTED	
	===//*===		C	SAND AT 35.0', DRY	
	===//*===		C		
	===//*===		C		
35.0	===//*===	35	C		
TOTAL DEPTH				Item #2	

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6938.4
TOTAL DEPTH: 40.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 34.5'
BORING ID: 0657
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.8	///*o*o//		C	CLAY, DAMP, FIRM, SANDY, FINE, SOME FINE GRAVEL, RED BROWN, NO ODOR	0.0-31.0
	///*o*o//		C		0
	///*o*o//		C		
1.8	///*o*o//		C		
1.8-4.5	**-o-/o**		C	SAND, FINE TO COARSE, SILTY, SLIGHTLY CLAYEY, SOME FINE GRAVEL, RED BROWN, SOME	
	-o-/o		C	GYPSUM SPOTS, MORE COARSE SAND AT 4.0' TO 4.5', DAMP, NO ODOR	
	-o-/o		C		
	-o-/o		C		
4.5	**-o-/o**		C		
4.5-5.0	/*/*/*/*/	5.0	C	INTERBEDDED CLAY AND SAND	
5.0-5.9	/////////		C	CLAY, MOIST, SLIGHTLY BLOCKY, WHITE GYPSUM SPOTS, CHARCOALING, SOME ROOTS IN SAMPLE	
5.9	/////////		C	REDISH BROWN, VERY DARK TO PURPLE CHARCOALING, NO ODOR, VERY STIFF	
5.9-6.2	*********		C	SAND, FINE, SOME COARSE, RED BROWN WITH ORANGE TINT	
6.2-8.5	////-////		C	CLAY, MOIST, SLIGHTLY BLOCKY, WHITE GYPSUM SPOTS, CHARCOALING, SOME ROOTS IN SAMPLE	
	////-////		C	REDISH BROWN, VERY DARK TO PURPLE CHARCOALING, NO ODOR, VERY STIFF, SLIGHTLY SILTY	
	////-////		C		
	////-////		C		
8.5-10.0	////-////		C	CLAY, SILTY, SANDY, FINE, SOME GYPSUM SPOTTING, DAMP TO MOIST, REDDISH BROWN WITH	
	////-////		C	PURPLE TINT, VERY STIFF TO HARD, MORE FISSLE, NO ODOR, SOME CHARCOALING	
	////-////	10	C		
10.0-11.2	////-////		C	CLAY, MOIST, HARD, SLIGHTLY SILTY, SOME CHARCOAL, PURPLISH BROWN, DAMP TO MOIST,	
11.2	////-////		C	NO ODOR	
11.2-12.5	***--/***		C	SAND, FINE, SILTY, SLIGHTLY CLAYEY, PURPLISH BROWN, DAMP, NO ODOR	
	--/		C		
12.5	***--/***		C	SILTY AT 12.0'	
12.5-13.2	///--*///		C	CLAY, SILTY, SLIGHTY SANDY, FINE, SLIGHTLY FISSLE, DAMP, VERY STIFF, REDDISH BROWN	
13.2-13.8	***--//**		C	SAND, VERY FINE TO FINE, SILTY, CLAYEY, DAMP TO MOIST, RED BROWN, NO ODOR	
13.8	***--//**		C		
13.8-14.5	///**--//		C	CLAY, SANDY, VERY FINE, SITLY, DAMP TO MOIST, NO ODOR	
14.5-15.0	///**--//	15	C	CLAY, SANDY, FINE, PURPLISH BROWN WITH ORANGE TINT, VERY STIFF, NO ODOR, SILTY, DAMP	
15.0-15.2	***--/***		C	SAND, FINE, SILTY, SLIGHTLY CLAYEY, REDDISH PURPLE WITH ORANGE TINT, NO ODOR	
15.2-15.7	///--**//		C	CLAY, SILTY, SANDY, FINE, ORANGE BANDS OF SAND IN CLAY, DAMP TO MOIST, NO ODOR, RED	
15.7-18.2	////////		C	BROWN CLAY	
	////////		C	CLAY, HARD, MOIST, REDDISH BROWN, CHARCOALING, BLOCKY, SOME CEMENTED SAND AT 17.0',	
	////////		C	NO ODOR	
18.2	////////		C		
18.2-18.7	****-/***		C	SAND, FINE, SLIGHTLY SILTY AND CLAYEY, PURPLISH BROWN WITH ORANGE TINT, SOME BLACK	
18.7	****-/***		C	SAND IN BAND FORM	
18.7-20.0	///--***/		C	CLAY, SILTY, VERY SANDY, SAND IN ORANGE BANDS, PURPLE BROWN, DAMP TO MOIST, VERY	
	///--***/	20	C	STIFF, NO ODOR	
20.0-21.0	///---**/		C	CLAY, VERY SILTY, SANDY, FINE, DAMP TO MOIST, PURPLISH BROWN, NO ODOR	
	///---**/		C		
21.0-22.2	///***--/		C	CLAY, VERY SANDY, SILTY, SAND IN ORANGE COLOR, PURPLE BROWN, VERY STIFF, NO ODOR	
	///***--/		C		
22.2-23.5	///***-//		C	LESS SILTY, MORE WHITE GYPSUM SPOTS, SOME CHARCOALING	
	///***-//		C		

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6938.4
TOTAL DEPTH: 40.0'
LOGGED BY: TM
DATE: 6-10-97
STATIC WATER: 34.5'
BORING ID: 0657
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
22.2-23.5	///***-//		C	**LESS SILTY**, MORE WHITE GYPSUM SPOTS, SOME CHARCOALING	
23.5-24.5	///***-//		C	**MORE SANDY**, FINE, SILTY, ORANGE SAND, PURPLE BROWN CLAY	
24.5	///***-//		C		
24.5-25.0	***--//**	25	C	**SAND**, FINE, SILTY, CLAYEY, ORANGISH PURPLE, DAMP, NO ODOR	
25.0-26.2	////*-///		C	**CLAY**, MOIST, REDDISH BROWN WITH PURPLE TINT, SLIGHTLY SANDY, SOME CHARCOALING,	
26.2	////*-///		C	SLIGHTLY SILTY, HARD, NO ODOR	
26.2-26.7	***//--**		C	**SAND**, FINE, CLAYEY, SILTY, MOIST, ORANGISH BROWN, NO ODOR	
26.7-27.5	///***-//		C	**CLAY**, VERY SANDY, VERY FINE TO FINE, SILTY, ORANGE PURPLE, MOIST, HARD, NO ODOR	
27.5	///***-//		C		
27.5-28.5	***--/***		C	**SAND**, VERY FINE TO FINE, SILTY, CLAYEY, ORANGISH PURPLE, MOIST, NO ODOR	
28.5	***--/***		C		
28.5-28.8	////**///		C	**CLAY**, SILTY MOIST, VERY STIFF, SANDY, FINE, PURPLISH BROWN WITH ORANGE TINT, DAMP	
28.8-29.7	***--/***		C	**SAND**, FINE, SILTY, CLAYEY, SOME COARSE, DAMP, NO ODOR (FINE AND COARSE GRAVEL ZONE	
29.7	**-o-/o**	30	C	AT 29.2-29.5)	
29.7-30.5	///***-//		C	**CLAY**, VERY SANDY, SILTY, DAMP TO MOIST, FISSLE, PURPLE BROWN WITH SOME ORANGE AND	
30.5	///***-//		C	BLACK SAND, NO ODOR	
30.5-31.0	***---***		C	**SAND**, VERY FINE TO FINE, SILTY, MOIST, ORANGISH RED TO PURPLISH BROWN, NO ODOR	
31.0-33.8	///*--///		C	**CLAY**, SLIGHTLY SANDY, SILTY, WET, SOME CHARCOAL VEINS, STIFF, REDDISH BROWN	
	///*--///		C		30.0
	///*--///		C		
33.8	///*--///		C		170.0
33.8-35.9	oo//*Soo		C	**GRAVEL**, VERY CLAYEY, SANDY, FINE TO COARSE, SILTY GRAVEL IS FINE TO COARSE, SOME	
	oo//*Soo		C	SOFT SANDSTONE NODULES, SLIGHTLY WATER BEARING AT 34.5'	
	oo//*Soo	35	C	SLIGHTLY WATER BEARING AT 35.2'	200.0
	oo//*Soo		C		
35.9	oo//*Soo		C		
35.9-40.0	===///===		C	**CHINLE FORMATION**	
	===///===		C	**CLAYEY**, PURPLISH BROWN WITH LIGHT GREEN SPOTS, MOIST, BLOCKY	
	===///===		C		
	===///===		C		
	===///===		C		
	===///===		C		
	===///===		C		
40.0	===///===	40	C		
TOTAL DEPTH					

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6936.2
TOTAL DEPTH: 35.5'
LOGGED BY: TM
DATE: 6-11-97
STATIC WATER: NOT FOUND
BORING ID: 0658
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.5	///*o*o//		C	**CLAY**, SANDY, FINE, FINE TO COARSE GRAVEL, BROWN, DAMP, ROOTS IN SAMPLE, NO ODOR	ALL SAMPLES 0.0
	///*o*o//		C		
	///*o*o//		C		
1.5-3.5	///*o*o//		C	**CLAY**, SANDY, VERY FINE, SILTY, GYPSUM VEINS, RED BROWN, DAMP TO MOIST, SOME FINE	
	///*o*o//		C	GRAVEL, NO ODOR	
	///*o*o//		C		
3.5	///*o*o//		C		
3.5-4.0	***/o/o**		C	**SAND**, FINE TO COARSE, CLAYEY, GRAVELLY, FINE AND COARSE, RED BROWN, DAMP, SOME BONE	
4.0	***/o/o**		C	WHITE CEMENTED SAND, NO ODOR	
4.0-4.2	////**///	5.0	C	**CLAY**, DRY TO DAMP, BROWN AND WHITE GYPSUM VEINS, STIFF, SLIGHTLY SANDY	
4.2-4.7	***o/o/**		C	**SAND**, FINE TO COARSE, SOME FINE GRAVEL, RED BROWN, CLAYEY, DAMP, NO ODOR	
4.7-5.0	/////////		C	**CLAY**, DAMP, BROWN AND WHITE GYPSUM VEINS, BLOCKY, STIFF, NO ODOR	
5.0-8.2	***oo-***		C	**SAND**, FINE TO COARSE, FINE GRAVEL, RED BROWN, DAMP, SLIGHT ORANGE TINT, SLIGHTLY	
	oo-		C	SILTY, NO ODOR	
	oo-		C		
8.2	***oo-***		C		
8.2-9.3	///--*///		C	**CLAY**, SILTY, SLIGHTLY SANDY, FINE, BROWN, SOME VEINING, ROOTS IN SAMPLE, DAMP TO	
	///--*///		C	MOIST, NO ODOR	
9.3	///--*///		C		
9.3-16.0	****/-***	10	C	**SAND**, FINE, SOME COARSE, SLIGHTLY CLAYEY, SILTY, REDDISH BROWN, DAMP, NO ODOR	
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C		
	****/-***		C	ORANGE SAND AT 13.0' TO 13.2'	
	oo//-		C	**VERY GRAVELLY**, FINE, MORE CLAYEY, SILTY AT 13.5' TO 15.0'	
	oo//-		C		
	oo//-	15	C		
	oo//-		C		
16.0	**oo//-**		C		
16.0-16.7	///--**//		C	**CLAY**, SILTY, SANDY, FINE, SOME GYPSUM SPOTS, PURPLISH BROWN, SOME ROOT MATTER,	
16.7	///--**//		C	STIFF, DAMP, NO ODOR	
16.7-19.8	***o*o***		C	**SAND**, FINE TO COARSE, SOME FINE GRAVEL, DAMP, PURPLISH BROWN, SOME CEMENTED SAND,	
	o*o		C	NO ODOR	
	o*o		C		
	o*o		C		
	o*o		C		
	o*o		C		
	o*o	20	C		
19.8-21.7	***o*o***		C	**SAND**, MEDIUM TO COARSE, SOME FINE, CLAYEY, RED BROWN, SOME FINE GRAVEL, DAMP, DENSE	
	o*o		C	CEMENTED SAND, NO ODOR	
21.7	***o*o***		C		
21.7-22.0	---**//--		C	**SILT**, SANDY, VERY FINE TO FINE, CLAYEY, PURPLISH BROWN, DAMP, STIFF, SAND IS BANDED	
22.0-22.2	****--***		C	**SAND**, FINE, SLIGHTLY SILTY, DAMP, PURPLISH BROWN WITH ORANGE TINT, NO ODOR	
22.2-23.8	///--**//		C	**CLAY**, SILTY, SANDY, FINE, SOME WHITE SPOTS, PURPLE BROWN, DAMP, NO ODOR	

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6936.2
TOTAL DEPTH: 35.5'
LOGGED BY: TM
DATE: 6-11-97
STATIC WATER: NOT FOUND
BORING ID: 0658
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
22.2-23.8	///--**//		C	**CLAY**, SILTY, SANDY, FINE, SOME WHITE SPOTS, PURPLE BROWN, DAMP, NO ODOR	
23.8-24.0	****--***		C	**SAND**, VERY FINE TO FINE, SILTY, LIGHT BROWN, DAMP, NO ODOR	ALL SAMPLES
24.0-26.7	///**-///		C	**CLAY**, SANDY, SILTY, DAMP TO MOIST, PURPLISH BROWN, SOME GYPSUM SPOTS, NO ODOR	0.0
	///**-///	25	C		
	///**-///		C		
	///**-///		C		
	///**-///		C		
26.7-28.2	////**///		C	**CLAY**, WET, RED BROWN, FIRM, SLIGHTLY SANDY, NO ODOR	
	////**///		C		
	////**///		C		
28.2-29.0	///*o*o//		C	**CLAY**, SANDY, WET, GRAVELLY, FINE, REDDISH PURPLE, SOME WHITE MEDIUM GYPSUM, NO ODOR	
29.0	///*o*o//		C		
29.0-29.2	ooo***ooo		C	**GRAVEL**, COARSE, CEMENTED SAND, COARSE, BONE WHITE, MOIST, WHITE, NO ODOR	
29.2-30.5	//o*-s///	30	C	**CLAY**, WET, GRAVELLY, FINE TO COARSE, SANDY, FINE, SILTY, SANDSTONE, FINE GRAVEL,	
30.5	//o*-s///		C	BONE WHITE, RED BROWN, NO ODOR, MORE GRAVELLY AT 30.0' TO 30.5', NOT WATER BEARING	
30.5-35.5	=========		C	**CHINLE FORMATION**	
	=========		C	**SHALE**, RED BROWN, FISSLE, DAMP, HARD	
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========	35	C		
35.5	=========		C		
TOTAL DEPTH					

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6932.1
TOTAL DEPTH: 20.0'
LOGGED BY: WHK
DATE: 6-11-97
STATIC WATER: 10.0'
BORING ID: 0659
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-3.5	///*o*o//		C	**CLAY**, SANDY, FIRM, SOME SCATTERED FINE GRAVEL, MOIST	0.0-12.0
	///*o*o//		C		0
	///*o*o//		C		
	///*o*o//		C		
	///*o*o//		C		
	///*o*o//		C		
3.5	///*o*o//		C		
3.5-7.5	////*////		C	**CLAY**, WET, STIFF, SOME CARBONATE FILIMENTS, VERY SLIGHTLY SANDY, RED BROWN	
	////*////		C		
	////*////	5.0	C		
	////*////		C		
	////*////		C		
	////*////		C		
	////*////		C		
7.5	////*////		C		
7.5-8.0	ooS/S/Soo		C	**GRAVEL**, CLAYEY, MAINLY SANDSTONE, FIRM, WET, RED BROWN	
8.0-9.5	****oo***		C	**SAND**, FINE, MODERATLY DENSE, BROWN, SCATTERED FINE GRAVEL, MOIST	
	****oo***		C		
9.5	****oo***		C		
9.5-10.0	ooo//SSoo	10	C	**GRAVEL**, CLAYEY, SANDSTONE AND CHERT, SOME FINE, RED BROWN, DENSE	
10.0-11.0	****//***		C	**SAND**, FINE, SLIGHTLY CLAYEY, **SLIGHTLY WATER BEARING**, SOFT, RED BROWN	
11.0	****//***		C		
11.0-15.3	////*-///		C	**CLAY**, FIRM, WET (NOT WATER BEARING), VERY SLIGHTLY SANDY TO SILTY, BROWN TO RED BROWN	
	////*-///		C		
	////*-///		C		150
	////*-///		C		
	////*-///		C		
	////*-///		C		
	////*-///		C		
15.3	////*-///	15	C		
15.3-15.6	oooo$Sooo		C	**GRAVEL**, DENSE, RED BROWN, SANDSTONE AND CHERT, MOIST, GRAVEL ROUNDED (TO 1")	5
15.6-20.0	=========		C	**CHINLE FORMATION**	0
	=========		C	**SHALE**, DENSE, RED BROWN, MOIST, FISSLE, SOME GREEN REDUCTION SPOTS	
	=========		C		0
	=========		C		
	=========		C		0
	=========		C		
	=========		C		0
	=========		C		
20.0	=========	20	C		0
TOTAL DEPTH					

LOGGED BY: TM

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6934.9
TOTAL DEPTH: 45.0'
LOGGED BY: WHK
DATE: 6-12-97
STATIC WATER: 32.0'
BORING ID: 0665
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-9.0	///x/x///		C	**CLAY**, WET, RED BROWN, STIFF, SOME TRASH (METAL PIPE, PLASTIC) IN UPPER 2'	
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///	5.0	C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
	///x/x///		C		
9.0	///x/x///		C		
9.0-17.0	///***///		C	**CLAY**, SANDY, WET, RED BROWN, FIRM	
	///***///	10	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///	15	C		
	///***///		C		
	///***///		C		
	///***///		C		
17.0	///***///		C		
17.0-24.5	////**///		C	**CLAY**, SLIGHTLY SANDY, WET, FIRM, BROWN	
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///	20	C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		
	////**///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN
CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6934.9
TOTAL DEPTH: 45.0'
LOGGED BY: WHK
DATE: 6-12-97
STATIC WATER: 32.0'
BORING ID: 0665
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
17.0-24.5	////**///		C	**CLAY**, SLIGHTLY SANDY, WET, FIRM, BROWN	
	////**///		C		
24.5	////**///		C		
24.5-28.0	*********	25	C	**SAND**, FINE, DAMP TO MOIST, RED BROWN, "SWEET" ODOR (POSSIBLE ADDITIVE OR LIGHT END)	
	*********		C		
	*********		C		
	*********		C		
	*********		C		
	*********		C		
28.0	*********		C		
28.0-34.3	000*S*S00		C	**GRAVEL**, SANDY (SANDSTONE, CHERT), STRONG GASOLINE ODOR (OLD), MOIST TO WET, NOT WATER BEARING, BROWN	
	000*S*S00		C		
	000*S*S00		C		
	000*S*S00	30	C		
	000*S*S00		C		
	000*S*S00		C		
	000*S*S00		C		
	000*S*S00		C		
	000*S*S00		C	**WATER BEARING AT 32.0'- 33.5'**	
	000*S*S00		C		
	000*S*S00		C		
34.3	000*S*S00		C		
34.3-34.5	/////////		C	**CLAY**, WET, SOFT, BROWN, NO ODOR	
34.5-35.0	*********	35	C	**SAND**, FINE, WET, BROWN, NO ODOR, MODERATELY DENSE	
35.0-41.0	000***000		C	**GRAVEL**, SANDY, BROWN, WET, NOT WATER BEARING, POSSIBLE WEAK "SWEET" ODOR	
	000***000		C		
	000***000		C		
	000***000		C		
	000***000		C		
	000***000		C		
	000***000		C		
	000***000		C		
	000***000		C		
	000***000		C		
	000***000	40	C		
	000***000		C		
41.0	000***000		C		
41.0-45.0	=========		C	**CHINLE FORMATION**	
	=========		C	**SHALE**, SANDY, RED, SOME RED SPOTS, DRY, HARD	
	=========		C		
	=========		C		
	=========		C		
	=========		C		
	=========		C		
45.0	=========	45	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6911.3
TOTAL DEPTH: 15.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0668
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.5	///**oo//		C	**CLAY**, SANDY, FINE, GRAVELLY, DRY, RED BROWN, SOFT	ALL SAMPLES NO ODOR
	///**oo//		C		
1.5	///**oo//		C		
1.5-9.0	///***///		C	**CLAY**, SANDY, RED BROWN, DRY, HARD, WHITE CARBONATE FILAMENTS, ROOT MATTER	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///	5.0	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
9.0	///***///		C		
9.0-11.0	///*o*///		C	**CLAY**, SANDY, RED BROWN, SOFT, WET, SANDIER THAN ABOVE, SOME FINE GRAVEL, SOME CARBONATE NODULES	
	///*o*///	10	C		
	///*o*///		C		
11.0	///*o*///		C		
11.0-11.7	ooo**/Soo		C	**GRAVEL**, SANDY, CLAYEY, (SANDSTONE, CHERT), MOIST, RED BROWN, DENSE	
11.7-15.0	=========		C	**CHINLE FORMATION**	
	=========		C	**SHALE**, RED BROWN TO PURPLE, SOME GREEN REDUCTION SPOTS, DENSE TO HARD, MOIST TO DRY	
	=========		C	FURTHER DOWN	
	=========		C		
	=========		C		
	=========		C		
	=========		C		
15.0	=========	15	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.
P.O. BOX 422 • LAS CRUCES, NM 88004
Ph: (505) 523-7674
FAX: (505) 523-7248 • E-mail: werpei@aol.com

October 20, 1998

Ms. Dorinda Mancini
Giant Refining Company
Ciniza Refinery
Route 3, Box 7
Gallup, New Mexico 87301

Item #3

Re: Well Closure Procedures

Dear Ms. Mancini,

As you are aware there a variety of monitoring well installation types at the Ciniza Refinery site. The following summarizes a proposed task scenario for a typical well closure at the Ciniza facility.

Task I: Remove all surface vaults and protective casings.

Task II: Determine if the casing has been grouted into the formation.

A: If the casing has been grouted a determination will be made as to the potential for pulling the casing. If the casing cannot be safely extracted or cannot be extracted with reasonable effort, proceed to Task III.

B: If the casing has not been grouted in place, an attempt to pull the casing will be made. If the casing cannot be pulled, the casing will be split to expose the drilling annulus. The casing will be split to a point just above the screens or perforations.

Task III: Grout tremmie tubing will be placed to the bottom of the well with a packer set just above the screens. A light grout consisting of a fluidized portland cement/montmorillonite clay (bentonite) mix will be injected into the screened zone. The grout mix will be pumped into the well and monitored for pressure and volume. The grout will be injected until the injection volume is equal to 1.5 times the calculated volume of the well and pressures indicate intrusion into the formation. A heavy grout will then be injected into the well until pump pressure stabilizes. Injection will stop, pressure will be allowed to drop, the packer(s) will be removed.

A: If the casing has been grouted in place, the remainder of the casing will then be grouted to the surface with a heavy fluidized portland cement/montmorillonite clay (bentonite) grout.

B: If the casing has not been grouted in place, the remaining annulus will be filled with a light grout as described above followed by a heavy grout when the annulus has stopped taking the light grout.

Task IV: The grout will be allowed to cure twenty four (24) hours. Any shrink back will then be filled with grout to the surface.

Task V: A closeout report will be provided to the client for final filing.

If you have any questions or comments, please call our office.

Sincerely,
Precision Engineering, Inc.

William H. Kingsley, P.E.

PRECISION ENGINEERING, INC.
505-523-7674

Well Closure Report

Well Identification: OW-20
Date of Closure: JANUARY 15, 1999
Water Depth At Closure: 32.10' Below Ground Surface

Length of Casing Extracted: 0 ft Interval: -- to --

Length of Perforated Casing: 0 ft Interval: -- to --

Length of Screen Extracted: 0 ft Interval: -- to --

Well Diameter: 4 in Interval: 0 to 59 (measured)
-- in Interval: -- to --
-- in Interval: -- to --
-- in Interval: -- to --

Gravel or Sand Pack Length: 14 ft Interval: 50 to 64
(reported) -- ft Interval: -- to --
-- ft Interval: -- to --
-- ft Interval: -- to --

Estimated Sand/Gravel Pack Void Ratio: 0.45

Estimated Total Well Volume (Including Sand/Gravel Pack): 21.4 ft³

Volume of Grout: 1) 35.8 ft³ Type: 11#-Portland Type I-II/Bentonite
Bentonite 6%
Interval: >50' to --
Tremmie Depth: 59'

2) 14.0 ft³ Type: 14#-Portland Type I-II/Bentonite
Bentonite 6%
Interval: 0 to 59'
Tremmie Depth: 59'

3) -- ft³ Type: --
--
Interval: -- to --
Tremmie Depth: --

Total Grout Volume: 49.8 ft³ Crew Foreman: William Kingsley

Notes: Grout shrink back @ 24 hr - 0.5'

GROUT VOLUME FOR OW-2D 1-15-99

ESTIMATE

RST 9" ANNULUS - (DRILLED W 7 5/8" OD HSA)

VOLUME OF ANNULUS:

ASSUMES BORING EXTENDED TO 83' & BACKFILLED W/CUTTINGS

TO 64' - CUTTING VOID RATIO ~ 0.65

$$\text{VOLUME } 83-64 = \left[(83-64)(0.65)\right]\left[\frac{\pi\left(\frac{9}{12}\right)^2}{4}\right] = 5.5 \text{ FT}^3$$

VOLUME OF GRAVEL PACK -

$$\text{VOLUME } 64-50 = \left[(64-50)(0.45)\right]\left[\frac{\pi\left(\frac{9}{12}\right)^2}{4}\right] = 2.8 \text{ FT}^3$$

VOLUME TO SURFACE

$$\text{VOLUME } 50-0 = \left[50-0\right]\left[\frac{\pi\left(\frac{4}{12}\right)^2}{4}\right] = 13.1 \text{ FT}^3$$

TOTAL VOLUME = 21.4 FT^3

BORING OW-20

SURFACE ELEVATION: 6961 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

PENETRATION RATE MINUTES/FOOT	SYMBOLS	DESCRIPTION
5.0	FILL	FILL
1.2		
1.3	CL	TRIASSIC PERIOD CHINLE FORMATION GRAY SILTY, FINE SANDY CLAY, SOFT, HIGHLY WEATHERED
1.7		
1.5		
1.5		GRADES WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE FROM 29 FEET
1.9		
3.3	SHALE	40 FEET: SHALE, REDDISH BROWN, SILTY, WITH SOME FINE SAND, AND OCCASIONAL THIN INTERBEDS OF SANDSTONE AND LIMESTONE, SOFT, FRESH
3.0		
2.7		
4.0		
2.3		
3.4		
1.6	MS	60 FEET: MUDSTONE, REDDISH BROWN, INTERBEDDED WITH LAMINAE OF WHITE TO LIGHT BROWN SANDSTONE, SOFT, FRESH
3.2		
6.3	SS	70 FEET: SANDSTONE, BROWN, COARSE-GRAINED, COMPOSED OF QUARTZ WITH MINOR CHERT, AND LIMESTONE, HARD, FRESH
6.0		
6.3		
		SHALE 82 FEET: SHALE, GRAY, SILTY WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 83.0 FEET ON 12/19/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 54.0 TO 64.0 FEET.
GRAVEL PLACED FROM 50.0 TO 64.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 50.2 FEET BELOW GROUND ON 1/5/81.

FILE COPY

LOG OF BORINGS

DAMES & MOORE

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 1 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 20.0
LOGGED BY: WHK
DATE: 1-14-99
STATIC WATER:
BORING ID: OW-20R1
PAGE: 1 of 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0	///**/////			**Clay,** very fine sandy, some gravel, wet red-brown.	
	///**/////				
1.5	///**/////				
1.5	***//****			**Sand,** fine, clayey, moist, red-brown.	
2.7	***//****				
2.7	ooo//oooo			**Gravel,** sandstone, clayey, moist, red-brown.	
3.5	ooo//oooo				
3.5	//////////			**Clay,** weak carbonate nodules, hard, wet, red-brown.	
	//////////				
	//////////	5.0			
5.5	//////////				
5.5	///*//*//			**Clay,** sandy, firm, wet, red-brown.	
	///*//*//				
	///*//*//				
	///*//*//				
	///*//*//				
8.3	///*//*//				
8.3	**o**o**o			**Sand,** coarse, gravelly, dense, moist, light brown.	
	oo**o				
	oo**o	10			
	oo**o				
	oo**o				
	oo**o				
	oo**o				
	oo**o				
	oo**o				
13.5	**o**o**o				
13.5	*o*o*o*o*			**Sand/Gravel,** coarse, water bearing (weak), dark grey.	
14.5	*o*o*o*o*				
14.5	//////////	15		**Clay,** soft, wet, not water bearing, grey/black.	
15.0	*********			**Sand,** fine, loose, water bearing, black.	
15.9	*********				
15.9	///*///*/			**Clay,** slightly sandy, firm, wet not water bearing, red-brown.	
	///*///*/				
	///*///*/				
	///*///*/				
18.8	///*///*/				
18.8	//*//*//*			**Clay,** sandy, soft, saturated, glistening (does not make water),	
	//*//*//*			black mottled.	
20.0	//*//*//*	20			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8- OD HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 2 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 335.0
LOGGED BY: WHK
DATE: 1-15-99
STATIC WATER: 29.0
BORING ID: OW-20 Rep
PAGE: 1 of 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0-12.5	**********			**Sand,** coarse, sandstone gravel up to three inches at five feet, medium dense, moist, red-brown.	No odor
	**********	5.0			
	**********	10		more dense	
12.5	**********				
12.5	////////////			**Clay,** fine sandy, soft to firm, wet (not water bearing), red-brown, laminar banded.	
	////////////	15			
15.4	////////////				
15.4	//--**--//			**Clay,** very silty, fine sandy, soft, wet, red brown.	
17.2	//--**--//				
17.2	**********			**Sand,** fine, loose, brown.	
17.5	**********				
17.5	//**--**//			**Clay,** fine sandy, very slightly silty, soft, wet, red-brown.	
	//**--**//	20			
23.2	//**--**//				|/

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8" OD HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA OW-20
Replacement 2 Continuous Sampling

LOG OF TEST BORINGS

FILE #: 98-199
ELEVATION: Existing
TOTAL DEPTH: 35.0
LOGGED BY: WHK
DATE: 1-15-98
STATIC WATER: 29.0
BORING ID: OW-20 rep
PAGE: 2 of 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.2	//////////	23		**Clay,** soft, wet, red-brown.	No Odor
24.0	//////////				
24.0	**-**-**-			**Sand,** fine, silty, loose, wet (very weak water bearing?), grey overall	Fetted
25.0	**-**-**-	25		with black bands.	Odor
25.0	*********			**Sand,** fine, silty, loose, **water bearing**, brown/grey.	
26.4	*********				
26.4	//-//-//-			**Clay,** silty, soft, wet, not water bearing, some grey/black banding.	
27.5	//-//-//-				
27.5	*********			**Sand,** fine, loose, **water bearing,** grey/black.	
28.0	*********				
28.0	//*//*//*			**Clay,** fine sand, stiff, wet, not water bearing, red-brown/grey,	
28.9	//*//*//*				
28.9	**/**/**/	30		**Sand,** clayey, loose, wet, not water bearing, grey.	
	//**/				
	//**/				
	//**/				
31.9	**/**/**/				
31.9	**o**o**o			**Sand,** gravel (sandstone and chert, some degraded shale), moderately dense,	No Odor
	oo**o			wet, not water bearing, dark grey, 3 inch sandstone layer at 33.2-33.5.	
33.5	**o**o**o				
33.5	---------			**Shale,** some reduction mottling, fine blocky, hard, damp to moist, red-brown.	

35.0	---------	35		[CHINLE FORMATION] WHK	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 8-5/8 OD HSA

5 of ow 14

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6918.6
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 28.0
BORING ID: B1
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.2	***///***		C	Sand, clayey, damp, brown, soft/loose, some fine gravel	0.0
	///	1.0	C		
1.2-5.0	///**--//		C	Clay, sandy, silty, moist to wet, brown, stiff, some root fibers in upper 3'	0.0
	///**--//		C	no odor	
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
5.0-8.8	///---///	5.0	C	Clay, silty, moist, brown, hard, scattered root fibers	0.0
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
8.8-9.1	000///000		C	Gravel, fine, clayey, damp, brown, dense, silica gravel to 1/2", no odor	0.0
9.1-10.0	///***///	9.0	C	Clay, sandy, damp, brown, hard, some root matter, no odor	0.0
	///***///		C		
10.0-12.4	/////////	10	C	Clay, blocky, moist to wet, brown, hard, root matter, gradational above and below	0.0
	/////////		C		
	/////////		C		
	/////////		C		
	/////////	12	C		
12.4-16.4	///--**//		C	Clay, silty, sandy, sandier @ 14' but gradational, moist to wet, brown, stiff to	0.0
	///--**//		C	hard, does not appear weathered in-situ, slightly fissured, pieces (2-3 mm) of	
	///--**//		C	clay in sandy matrix, root matter	
	///--**//		C		
	///--**//		C		
	///--**//	15	C		
	///--**//		C		
	///--**//	16	C		
16.4-16.7	*********		C	Sand, fine, moist, red brown, loose	0.0
16.7-17.4	///***///	17	C	Clay, sandy, wet, brown, very stiff	
17.4-22.9	///++////		C	Clay, slightly fissured but not as much as above, some 4" slightly sandy zones	0.0
	///++////		C	some carbonate nodules, wet, dark brown, hard	
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///++////		C		
	///**++//		C	Clay, slightly sandy, some carbonate filaments, occasional individual coarse sand	0.0
22.9-30.0	///**++//		C	grains of silica rock, wet, dark brown, soft, no odor, free water on tip of sample	
	///**++//	23	C	but not in samples	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6918.6
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 28.0
BORING ID: B1
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
	///**++//		C	continued from page 1	
	///**++//	24	C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
	///**++//		C		
30.0-32.5	***/0****	30	C	Sand, slightly clayey, occasional pebbles, weakly water bearing, brown, very	0.0
	/0*		C	soft/loose	
	/0*		C		
	/0*		C		
	/0*	32	C		
32.5-39.5	///---+//		C	Clay, silty, some carbonate filaments and staining, more carbonate filaments below	0.0
	///---+//		C	32', wet, saturated but not water bearing, light brown, soft to firm	
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//		C		
	///---+//	39	C		
39.5-41.1	///000///		C	Clay, gravelly, wet, saturated but not water bearing, light brown, soft	0.0
	///000///		C		
	///000///		C		
	///000///	41	C		
41.1-47.1	***00****		C	Sand, coarse, fine to medium gravelly, water bearing, brown, dense, subrounded	0.0
	00*		C	to rounded silica rock, some sandstone pieces	
	00*		C		
	00*		C		
	00*		C		
	00*		C		
	00*		C		
	00*		C		
	00*		C		
	00*		C		

Item #4

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6918.6
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 28.0
BORING ID: B1
PAGE: 3

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	000		C	continued from page 2	
	000	47	C		
47.1-50.0	---------		C	CHINLE FORMATION	
	---------		C	Shale, some green mottling, fissle, moist, hard, slightly blocky, no odor	0.0
	---------		C		
	---------		C		
	---------		C		
	---------	50	C		
TD				end 11:00a -- depth to water @ 12:15p 28.0'	
				grout hole with bentonite/cement/8% grout to surface	
				time end 1:15p -- water depth affected by hole collapse	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

Due w Propane Bullet Tank

X

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6917.6
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 22.3
BORING ID: B3
PAGE: 1

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.3	///**00//		C	Clay, sandy, gravelly, wet, brown, soft, no odor	0.0
	///**00//	1.0	C		
1.3-2.7	///**////		C	Clay, fine sandy, wet, brown to red brown, soft, no odor	0.0
	///**////	2.0	C		
2.7-5.0	/////////		C	Clay, wet, very soft, some root matter	0.0
	/////////	3.0	C		
	/////////		C		
	/////////		C		
	/////////		C		
5.0-8.4	/////////	5.0	C	Clay, wet, dark brown, stiff, no odor, some root matter	0.0
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////	8.0	C		
8.4-10.3	///+++///		C	Clay, carbonate filaments common, some carbonate nodules scattered, wet, stiff	0.0
	///+++///	9.0	C	red brown, no odor	
	///+++///		C		
	///+++///	10	C		
10.3-10.6	///000///		C	Clay, gravelly, wet, red brown, stiff, no odor	0.0
10.6-12.9	///**+--/	11	C	Clay, fine sandy, silty, wet, light red brown, firm, no odor, scattered fine	0.0
	///**+--/		C	gravel, some root matter, some carbonate filaments, slightly blocky	
	///**+--/		C		
12.9-14.1	///*+++//		C	Clay, slightly sandy, carbonate filaments abundant, wet, brown, firm, carbonate	0.0
	///*+++//	13	C	filaments stain sample, white CCI2, no odor, root matter abundant	
	///*+++//		C		
14.1-14.4	*********	14	C	Sand, fine, moist, light brown, loose, no odor	0.0
14.4-15.3	//***+--/		C	Clay as at 12.9'-14.1' but slightly more fine sand, no odor	0.0
	//***+--/	15	C		
15.3-16.7	***/*****		C	Sand, fine, slightly clayey, moist to wet, brown, loose, no odor	0.0
	/**	16	C		
16.7-18.3	///**////		C	Clay, fine sandy in laminations, wet, dull brown, soft, root matter common, no odor	0.0
	///**////	17	C		
	///**////		C		
	///**////	18	C		
18.3-18.9	/////////		C	Clay, blocky, slabby, wet, dull brown, firm, no odor	0.0
18.9-20.0	///***///	19	C	Clay, very sandy, wet, brown, soft	0.0
	///***///		C		
20.0-24.4	***000***	20	C	Sand, very gravelly, rounded to subrounded silica rock, some sandstone white, some	5 (upper 6")
	000		C	odor in upper 5", stained black to dark grey, water bearing, dense, multicolored	
	000		C	red brown matrix	
	000		C		
	000		C		
	000		C		
	000		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6917.6
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 3-30-95
STATIC WATER: 22.3
BORING ID: B3
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
	OOO		C		
	OOO	24	C		
24.4-25.0	---***---		C	CHINLE FORMATION	
	---***---	25	C	Shale, very sandy, weathered, grey, green, no odor, hard	0.0
25.0-30.0	---**----		C	Shale, sandy, fissle, some green grey streaks, moist, hard	0.0
	---**----		C		
	---**----		C		
	---**----		C		
	---**----		C		
	---**----		C		
	---**----		C		
	---**----		C		
	---**----		C		
	---**----		C		
	---**----	30	C		
TD				stop drilling @ 4:05p	
				water @ 4:20p -- 22.3'	
				grout to surface with bentonite/cement	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8/22/96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.0	//////// ////////		C C	CLAY, LOOSE, DRY, SOFT, RED BROWN	
1.0-1.6	***///***		C	SAND, CLAYEY, DARK BROWN, MOIST, SOFT, APPEARS CONTAMINATED	
1.6-6.3	//////// //////// //////// //////// //////// //////// //////// //////// ////////	5.0	C C C C C C C C C C	CLAY, RED BROWN, FIRM, SOME ROOT MATTER, MOIST	
6.3-8.5	///***/// ///***/// ///***/// ///***/// ///***///		C C C C C C	CLAY, SANDY, VERY FINE, MOIST, FIRM, RED BROWN, SOME ROOT MATTER	
8.5-12.3	//////// //////// //////// //////// //////// //////// //////// //////// ////////	10	C C C C C C C C C	CLAY, FIRM, RED BROWN, MOIST	
12.3-12.5	///**-///		C	CLAY, SANDY, SILTY, GRADES TO SILT @ 12.5	
12.5-13.3	---------		C	SILT, DRY, FIRM, MOIST, LIGHT BROWN	
13.3-13.5	///---///		C	CLAY, SILTY	
13.5-13.75	*********		C	SAND, LOOSE, DRY, FINE, BROWN	
13.75-15.8	////*//// ////*//// ////*////	15	C C C	CLAY, WEAKLY SANDY, BROWN, STIFF, MOIST	
15.8-16.7	///***/// ///***///		C C	CLAY, VERY SANDY (COARSE), WET (NOT WATER BEARING), FIRM, RED BROWN	
16.7-17.75	///---/// ///---///		C C	CLAY, SILTY, STIFF, MOIST, RED BROWN	
17.75-21.8	//////// //////// //////// //////// //////// //////// //////// //////// ////////	20	C C C C C C C C C C	CLAY, WET, RED BROWN, STIFF, SOME ROOT MATTER	
21.8-25.3	///***/// ///***/// ///***///		C C C	CLAY, FINE SANDY, WET, HYDROCARBON ODOR, GREY BROWN, SOME BLACK MOTTLING, NOT WATER BEARING, SOFT	22'-20 ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8-22-96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.8-25.3	///***/// ///***/// ///***/// ///***/// ///***///	25	C C C C C	**CLAY**, FINE SANDY, WET, HYDROCARBON ODOR, GREY BROWN, SOME DARK MOTTLING, NOT WATER BEARING, SOFT	22'-20 ppm 24'-29 ppm
25.3-27.0	****/**** ****/**** ****/**** ****/****		C C C C	**SAND**, LOOSE, VERY WET, VERY WEAKLY FLUID BEARING, HYDROCARBON SHEEN, GREY BROWN, CLAYEY	26'-34ppm
27.0-28.1	****/**** ****/****		C C	AS ABOVE BUT RED BROWN, LESS ODOR	
28.1-29.5	///**//// ///**//// ///**////		C C C	**CLAY**, SLIGHTLY SANDY, SOFT, WET, NOT WATER BEARING	28'-48ppm
29.5-31.4	***///*** ***///*** ***///***	30	C C C	**SAND**, CLAYEY, SOFT, WET, NOT WATER BEARING, CANNOT DETECT ODOR, VERY WEAK WATER BEARING	30'-0ppm
31.4-34.8	///***/// ///***/// ///***/// ///***/// ///***/// ///***/// ///***///		C C C C C C C	**CLAY**, SANDY, FINE, SOFT, WET (NOT WATER BEARING), VERY WEAKLY SANDY > 33.0'	32'-0ppm 34'-0ppm
34.8-36.1	***--**** ***--**** ***--****	35	C C C	**SAND**, BROWN, SILTY, GRAVELLY (1"), MOIST, NO ODOR, MODERATELY DENSE **WATER BEARING** 35.0-36.1, NO ODOR	
36.1-41.2	//////// //////// //////// //////// //////// //////// //////// //////// //////// ////////	40	C C C C C C C C C C	**CLAY**, LIGHT BROWN, CARBONATE SALTS APPEAR AS WEB-LIKE FILIMENTS, SOME ROOT MATTER, STIFF	36'-0ppm 38'-0ppm 40'-0ppm
41.2-42.7	000000000 000000000 000000000		C C C	**GRAVEL (2")**, CHERT, SANDSTONE, PETRIFIED WOOD, **WATER BEARING**, MULTICOLORED	
42.7-48.0	========= ========= ========= ========= ========= ========= =========	45	C C C C C C C C	**SHALE**, RED, DRY/MOIST/WET, DENSE **CHINLE FORMATION**	42'-20ppm 44'-30ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4"ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8-22-96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
42.7-48.0	==========		C	SHALE, RED, DRY/MOIST/WET, DENSE	
	==========		C	CHINLE FORMATION	46'-10ppm
	==========		C		
	==========		C		
	==========		C		
48.0-50.0	==========		C	SHALE, DARK RED TO PURPLE RED, DRY, DENSE	48'-0ppm
	==========		C		
	==========		C		
	==========	50	C		50'-0ppm
TOTAL DEPTH					
		55			
		60			
		65			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6917.6
TOTAL DEPTH: 36.5
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 19' @ 27 HRS
BORING ID: 0648
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-6.2	///--////		C	**CLAY**, SLIGHTLY SILTY, ROOT MATTER, RED, BROWN, STIFF, MOIST	PID-0ppm ALL SAMPLES
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////	5.0	C		
	///--////		C		
6.2	///--////		C		
6.2-7.1	***///***		C	**SAND**, CLAYEY, GRADATIONALLY CONTACTS TOP, LOOSE, DRY, RED BROWN	
7.1	***///***		C		
7.1-8.3	///---///		C	**CLAY**, VERY SILTY, LAMINAR SILT, DRY-DAMP, FIRM, RED BROWN	
	///---///		C		
8.3	///---///		C		
8.3-12.3	---///---		C	**SILT**, CLAYEY, LAMINAR, DAMP-DRY, LIGHT BROWN, FIRM, ROOT MATTER	
	---///---		C		
	---///---	10	C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
12.3	---///---		C		
12.3-12.8	***---***		C	**SAND**, SILTY, FINE, LOOSE, DRY, RED BROWN	
12.8-14.3	///---///		C	**CLAY**, SILTY, STIFF, DAMP, ROOT MATTER, RED BROWN, SILT LAMINAR	
	///---///		C		
14.3	///---///		C		
14.3-16.5	***00****	15	C	**SAND**, FINE, SCATTERED GRAVEL TO 2", SILTY, RED BROWN, MODERATELY DENSE, DRY-DAMP	
	00*		C		
	00*		C		
16.5	***00****		C		
16.5-21.5	***SS****		C	**SAND**, COARSE-FINE, WET, SOME SANDSTONE GRAVEL TO 3", RED BROWN, SOME CLAY @ 19.5-20.0, WATER BEARING @ 20.0	
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*	20	C		
	SS*		C		
	SS*		C		
21.5	***SS****		C		
21.5-25.0	/////////		C	LOST SAMPLE-POSSIBLE SOFT, WET, CLAY BASED ON LEFTOVERS IN SAMPLER	
	/////////		C		
	/////////		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6917.6
TOTAL DEPTH: 36.5
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 19.0 @ 27 HRS
BORING ID: 0648
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.5-25.0	////////		C	LOST SAMPLE-POSSOBLE SOFT, WET, CLAY BASED ON LEFTOVERS IN SAMPLER	PID-0ppm ALL SAMPLES
	////////		C		
	////////		C		
25.0	////////	25	C		
25.0-28.0	////////		C	**CLAY**, WET, SOFT, RED BROWN	
	////////		C		
	////////		C		
	////////		C		
	////////		C		
28.0	////////		C		
28.0-30.0	*0*SS*0*0		C	**SAND & GRAVEL**, 4" SANDSTONE, CHERT, **WATER BEARING**, **HYDROCARBON ODOR**, LOOSE, MULTICOLORED	
	*0*SS*0*0		C		
	*0*SS*0*0		C		
30.0	*0*SS*0*0	30	C		
30.0-32.0	S=S=S=S=S		C	**CHINLE FORMATION**	
	S=S=S=S=S		C	SAMPLER REFUSAL-POSSIBLE "SWEET" ODOR, SANDSTONE & SHALE > 30', NO ODOR, DRILL	
	S=S=S=S=S		C	WITHOUT SAMPLER TO 35', MATRIX > 30' GREYGREEN, CEMENTED VERY DENSE ROCK @ 32'	
32.0	S=S=S=S=S		C	DIVE SAMPLER 3"-STUCK IN ROCK	
32.0-36.5	S=S=S=S=S		C	**SANDSTONE & SHALE**, HARD, CALCARIOUS CEMENTATION, FINE TO COARSE, SHALE, GREEN-RED B	
	S=S=S=S=S		C		
	S=S=S=S=S		C		
	S=S=S=S=S		C		
	S=S=S=S=S		C		
	S=S=S=S=S	35	C		
	S=S=S=S=S		C		
	S=S=S=S=S		C		
36.5	S=S=S=S=S		C		
TOTAL DEPTH				NOTE: HYDROCARBON ODOR APPEARS TO BE CONCETRATED IN WATER LYING ON CHINLE FORMATION	
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.4
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 20.0
BORING ID: 0649
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-3.1	///--////		C	**CLAY**, DAMP, MOIST, RED BROWN, STIFF, SLIGHTLY SILTY, ROOT MATTER	PID-0ppm ALL SAMPLES
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
3.1	///--////		C		
3.1-4.0	***///***		C	**SAND**, CLAYEY, RED BROWN, MODERATELY DENSE, DRY-DAMP	
	///		C		
4.0	***///***		C		
4.0-5.0	///---///	5.0	C	**CLAY**, MOIST, RED BROWN, STIFF, SILTY, ROOT MATTER	
5.0-6.0	***///***		C	**SAND**, CLAYEY, RED BROWN, SOME COARSE, MODERATELY DENSE, DAMP	
6.0	***///***		C		
6.0-6.9	///***///		C	**CLAY**, SANDY, RED BROWN, VERY STIFF, MOIST	
6.9	///***///		C		
6.9-8.5	///--*///		C	**CLAY**, SLIGHTLY SILTY, WEAKLY SANDY, SOME CHARCOAL, SOME ROOT MATTER, RED BROWN,	
	///--*///		C	STIFF	
8.5	///--*///		C		
8.5-8.9	*********		C	**SAND**, MEDIUM, RED BROWN, MODERATELY DENSE, DAMP	
8.9-17.0	///**////		C	**CLAY**, SLIGHTLY SANDY, RED BROWN, VERY STIFF, MOIST, SOME SCATTERED GRAVEL	
	///**////	10	C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////	15	C		
	///**////		C		
	///**////		C		
	///**////		C		
17.0	///**////		C		
17.0-17.3	***//****		C	**SAND**, RED BROWN, FINE, MOIST, SLIGHTLY CLAYEY, LOOSE	
17.3-23.2	///00////		C	**CLAY**, WET, RED BROWN, STIFF, SCATTERED FINE GRAVEL (RARE), SOME WHITE FILIMENTS OF	
	///00////		C	CALCIUM CARBONATE SALTS	
	///00////		C		
	///00////		C		
	///00////	20	C		
	///00////		C		
	///00////		C		
	///00////		C		
	///00////		C		
	///00////		C		
	///00////		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.4
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 20.0
BORING ID: 0649
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
23.2-25.0	000***/00		C	**GRAVEL**, SANDY, CHERT, SANDSTONE, SLIGHTLY CLAYEY, RED BROWN, DENSE, **WATER BEARING**	PID-0ppm ALL SAMPLES
	000***/00		C		
	000***/00		C		
25.0	000***/00	25	C		
25.0-30.0	===***===		C	**CHINLE FORMATION**	
	===***===		C	**SHALE**, SANDY, RED BROWN/GREEN INTERBEDS, DENSE, MOIST, NOT WATER BEARING	
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
30.0	===***===	30	C		
TOTAL DEPTH					
		35			
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN

FILE #:	97-032
ELEVATION:	6901.38
TOTAL DEPTH:	30'
LOGGED BY:	WHK
DATE:	3-23-97
STATIC WATER:	NOT FOUND
BORING ID:	MP-4
PAGE:	1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-17.1			C	CLAY, SOFT IN UPPER 2 FEET THEN STIFF, WET, RED BROWN, SOME ROOT MATTER AND	ALL SAMPLES
			C	SLICKENSIDED JOINTING	0
		5.0	C		
		10	C	HARD GREATER THAN 10.0'	
		15	C		
17.1			C		
17.1-18.5			C	SILT, GREY BROWN, MODERATELY DENSE, CLAYEY, LAMINATED, DAMP	
18.5			C		
18.5-21.5			C	SAND, CLAYEY, MOIST, MODERATELY DENSE, LIGHT RED BROWN, (Qe)	
		20	C	MORE CLAY GREATER THAN 20.0 FEET	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6901.38
TOTAL DEPTH: 30.0'
LOGGED BY: WHK
DATE: 3-23-97
STATIC WATER: NOT FOUND
BORING ID: MP-4
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.2	///oo////		C	CLAY, GREY, SOME PEBBLES, MOIST-WET, VERY STIFF	ALL SAMPLES
23.2-30.0	===***===		C	CHINLE FORMATION	0
	===***===		C	SHALE, SANDY, FISSLE, RED AND GREY WHERE SANDIER, HARD, MOSTLY RED SHALE, DAMP-DRY	
	===***===	25	C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
30.0	===***===	30	C		
TOTAL DEPTH					
		35			
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

Sheet: 1 of 2

PRECISION ENGINEERING, IN

File #: 96-054

Bore Point: TWO

LOG OF TEST BORINGS

Site: CINIZA REFINERY
GALLUP, NM

Water Elev: 25.2'

Elevation: 6916.0

Boring No.: MP-9

Date: 4-3-96

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	%M	L	PI	CLASS.
	0.0-17.3		///		C	CLAY, DARK RED BROWN, HARD, MOIST, SLIGHTLY SILTY				
			///		C					
			///		C					
			///		C					
			///	2.5	C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	5.0	C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	7.5	C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	10	C					
			///		C	SLIGHTLY SANDY @ 10.0'				
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///		C					
			///	15	C					
			///		C					
			///		C					
			///		C					
			///		C					
	17.3-20.2		///		C	CLAY, DARK RED BROWN, FIRM, WET (NOT WATER BEARING), SOME PEBBLES TO ~ 1" PRESENT, PEBBLES ARE MAINLY SANDSTONE				
			///		C					
			///		C					
			///		C					
			///		C					
			///	20	C					
			///		C					
	20.2-21.8		///		C	CLAY, VERY SANDY, WET/SATURATED, SOME FREE WATER ON SAMPLE, VERY WEAK THOUGH SOFT, BROWN				
			///		C					
			///		C					
	21.8-22.5		///		C	SAND, SOFT, VERY CLAYEY, SOME FREE WATER, (WEAK), BROWN				
			///		C					

Size & Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHK

Sheet: 2 OF 2

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

Bore Point: TWO

Water Elev: 25.2'

Boring No.: MP-9

File #: 96-054

Site: CINIZA REFINERY GALLUP, NM

Elevation: 6916.0

Date: 4-3-96

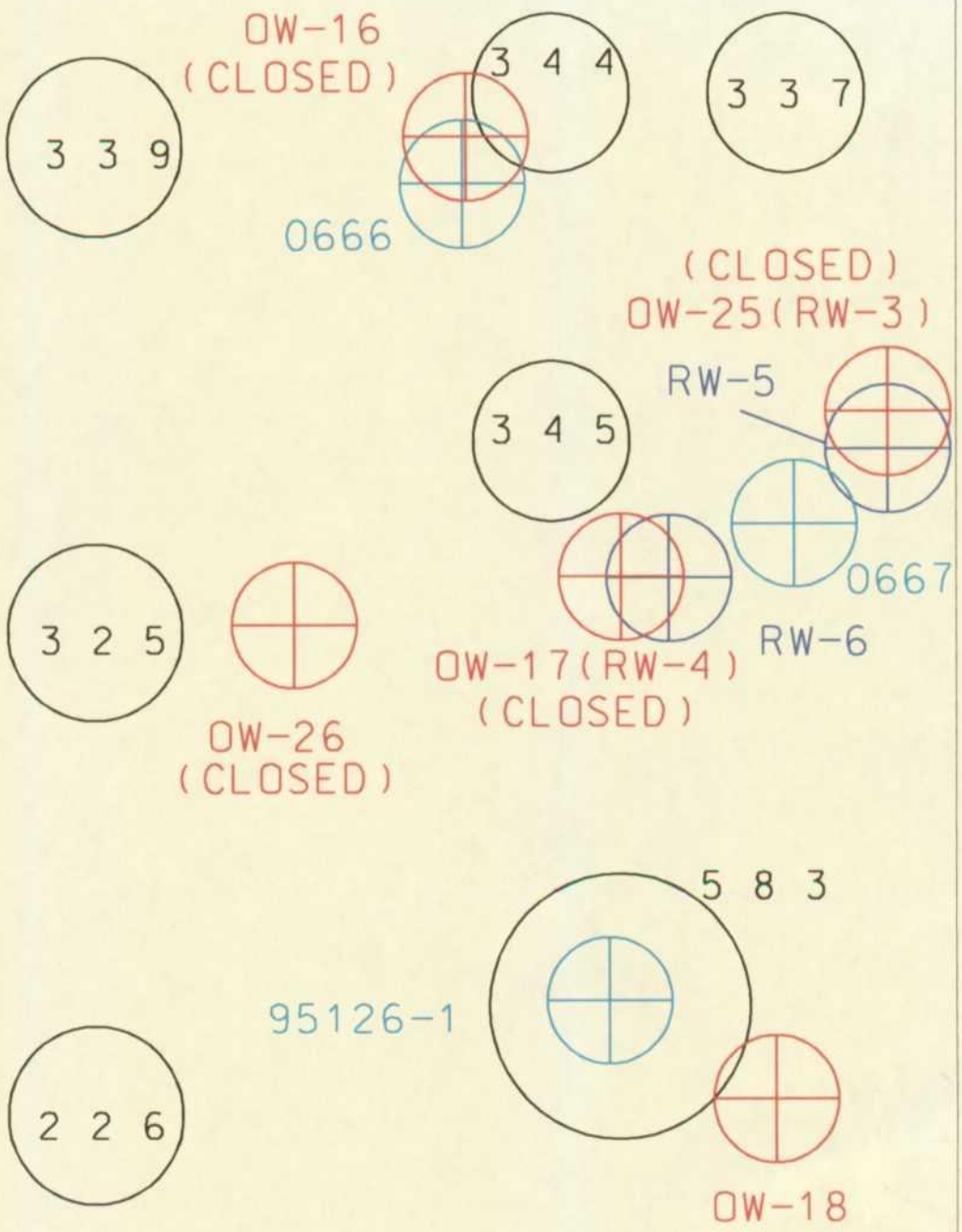
LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	%M	L	PI	CLASS
	22.5-25.2		///**/ ///**/ ///**/ ///**/	25	C C C C	CLAY, BROWN, FIRM, WET (NOT WATER BEARING), WHITE FILIMENTS, CALCAREOUS OR SULFATE, SOME VERY THIN SANDS THAT ARE NOT WATER BEARING				
	25.2-25.8		****** ******		C C	SAND, FINE, WATER BEARING, BROWN, SOFT				
	25.8-26.7		//////		C	CLAY, WET, FIRM, BROWN				
	26.7-28.3		****** ****** ******		C C C	SAND, FINE TO MEDIUM, WATER BEARING, (POOR), LOOSE TO MEDIUM DENSE, BROWN				
	28.3-30.0		////// ////// ////// //////	30	C C C C	CLAY, BROWN, FIRM, WET, (NOT WATER BEARING)				
	30.0-30.9		***//* ***//*		C C	SAND, FINE, MEDIUM, CLAYEY, BROWN, WATER BEARING				
	30.9-31.2		000000 000000		C C	GRAVEL, TO 4", WATER BEARING, BROWN, DENSE, MAINLY SANDSTONE GRAVEL				
	31.2-33.3		SSS**S SSS**S SSS**S		C C C	CHINLE FORMATION SHALE, GREEN BROWN, SANDY, SOME RED BROWN PARTINGS, WET, DENSE				
	TD			35 40 45	C C C C C C C C C C C C C C C C C C C C C C C C C					

Size & Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHK

OW-17(RW-4)
Vicinity Map

Item #6



PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6938.2
TOTAL DEPTH: 20.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0666
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-2.5	///***///		C	CLAY, SANDY, MOIST, SOFT, ~~LIGHT RED~~ BROWN	0.0-13.2 NO ODOR
2.5	///***///		C		
2.5-3.8	****--***		C	SAND, FINE, SILTY, NO PLASTICITY, MOIST, LOOSE, RED BROWN	
3.8	****--***		C		
3.8-6.3	*********	5.0	C	SAND, MEDIUM, MULTICOLORED RED BROWN, LOOSE, MOIST	
6.3	*********		C		
6.3-6.9	///--**//		C	CLAY, SILTY, SANDY, RED BROWN, FIRM, WET	
6.9-8.0	****oo***		C	SAND, COARSE, GRAVELLY, LOOSE, MOIST, RED BROWN	
8.0	****oo***		C		
8.0-9.6	/////////		C	CLAY, STIFF, CARBONATE FILAMENTS AS CRACK FILLING, RED BROWN, WET	
9.6	/////////		C		
9.6-10.0	****oo***	10	C	SAND, COARSE, GRAVELLY, RED BROWN, MOIST, LOOSE, MEDIUM DENSE	
10.0-13.2	////**///		C	CLAY, FINE, SANDY, RED BROWN, SOFT, WET	
13.2	////**///		C		
13.2-13.4	*********		C	SAND, FINE, RED BROWN, LOOSE, MOIST	13.2-14.8
13.4-14.3	////**///		C	CLAY, FINE, SANDY, RED BROWN, SOFT, WET	WEAK ODOR
14.3	////**///		C		
14.3-14.6	*********	15	C	SAND, FINE, RED BROWN, MOIST, LOOSE	14.8-20.0
14.6-14.8	///***///		C	CLAY, SANDY, BROWN, WET, NOT WATER BEARING, SOFT	NO ODOR
14.8-15.4	/////////		C	CLAY, RED BROWN, WET, STIFF, (POSSIBLE WEATHERED SHALE)	
15.4-20.0	==========		C	CHINLE FORMATION	
	==========		C	SHALE, RED, DAMP TO DRY, FISSLE, HARD, CRUMBLY	
	==========		C		
	==========		C		
	==========		C		
	==========		C		
	==========		C		
	==========		C		
20.0	==========	20	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6938.6
TOTAL DEPTH: 35.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0667
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLER	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-2.0	///**--// ///**--// ///**--//		C C C	CLAY, FINE, SANDY, SILTY, WET, BROWN	0.0-29.5 NO ODOR
2.0	///**--//		C		
2.0-4.2	***ooo*** ***ooo*** ***ooo***		C C C	SAND, GRAVELLY, FINE, BROWN, MOIST, LOOSE	
4.2	***ooo***		C		
4.2-5.0	///***///		C	CLAY, SANDY, SOME CARBONATE NODULES AND FILAMENTS, STIFF, MOIST TO WET, BROWN	
5.0	///***///	5.0	C		
5.0-7.8	********* ********* ********* ********* *********		C C C C C	SAND, FINE TO MEDIUM, BROWN, MOIST TO DAMP, LOOSE	
7.8	*********		C		
7.8-9.0	///--**//		C	CLAY, SILTY, FINE, SANDY, MOIST TO WET, BROWN, STIFF	
9.0	///--**//		C		
9.0-9.2	ooo***ooo		C	GRAVEL, SANDY, BROWN, DAMP, LOOSE	
9.2-12.0	////**/// ////**/// ////**/// ////**///	10	C C C C	CLAY, VERY FINE, SANDY, MOIST TO WET, SOFT, RED BROWN	
12.0	////**///		C		
12.0-14.5	///---/// ///---/// ///---/// ///---///		C C C C	CLAY, SILTY, WET, BROWN, SOFT	
14.5	///---///		C		
14.5-18.1	********* ********* ********* ********* ********* *********	15	C C C C C C	SAND, VERY FINE, BROWN, MODERATELY DENSE, MOIST	
18.1	*********		C		
18.1-19.0	///***///		C	CLAY, SANDY, SOFT, BROWN, WET	
19.0	///***///		C		
19.0-20.4	***ooo*** ***ooo***	20	C C	SAND, GRAVELLY, BROWN-MULTICOLOR, DENSE, MOIST	
20.4	***ooo***		C		
20.4-23.0	////**/// ////**/// ////**/// ////**/// ////**///		C C C C C	CLAY, SLIGHTLY VERY FINE, SANDY, SOFT, RED BROWN, WET, WATER ON SURFACE OF SAMPLE 22.8'-23.0', DOES NOT APPEAR WATER BEARING	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SRR SITE PLAN
CINIZA REFINERY

FILE #: 97-070
ELEVATION: 6938.6
TOTAL DEPTH: 35.0'
LOGGED BY: WHK
DATE: 6-17-97
STATIC WATER: NOT FOUND
BORING ID: 0667
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.0-29.5			C	CLAY, SANDY, LAMINAR, STIFF, WET, RED BROWN, GRADES SANDIER FURTHER DOWN	0.0-29.5 NO ODOR
		25	C		
29.5			C		
29.5-32.8		30	C	SAND, COARSE, DARK GREY, MOIST, MEDIUM DENSE, WATER BEARING, VERY GRAVELLY AT 31.0' FREE HYDROCARBON AND WATER ON TOP OF SHALE	WEAK HYDROCARBON ODOR
32.8			C		STRONG
32.8-35.0			C	CHINLE FORMATION SHALE, HARD, DRY TO DAMP, RED BROWN, CRUMBLY (WITH DIFFICULTY), REDUCTION SPOTS	NO ODOR
35.0		35	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

PROJECT: CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6942.5
TOTAL DEPTH: 40.0 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.0 FEET
BORING ID: EW-5
PAGE: 1 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-3.8	***-/-***		C	SAND, SILTY, CLAYEY, SOME PEBBLES, WET, NO ODOR, RED-BROWN, FILL LOOSE	
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
	-/-		C		
3.8	***-/-***		C		
3.8-8.9	***///***		C	SAND, CLAYEY, WET, DENSE, RED-BROWN, SOME FINE GRAVEL	
	///	5.0	C		
	///		C		
	///		C		
	///		C		
	///		C		
	///		C		
	///		C		
8.5	***///***		C		
8.5-8.9	/////////		C	CLAY, WET, STIFF, RED-BROWN	
8.9-9.7	///***///		C	CLAY, VERY FINE SANDY, STIFF, RED-BROWN, WET, LAMINAR BANDING	
9.7-9.8	**********	10	C	SAND, FINE, WHITE, MOIST, LOOSE	
9.8-10.0	///***///		C	CLAY, VERY FINE SANDY, STIFF, RED-BROWN, WET, LAMINAR BANDING	
10.0-13.8	/////////		C	CLAY, SOFT, BROWN TO RED-BROWN, FINE, BLOCKY, VERY WET, LAMINAR BANDING	
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
13.8	/////////		C		
13.8-14.5	///***///		C	CLAY, VERY FINE SANDY, RED-BROWN, MODERATELY DENSE, WET/MOIST	
14.5-14.6	**********	15	C	SAND, VERY FINE, MOIST, LOOSE, WHITE TO LIGHT BROWN, LAMINAR BANDING	
14.6-16.5	////**///		C	CLAY, WET, SOFT, SLIGHTLY FINE SANDY, NO STRUCTURE	
	////**///		C		
16.5	////**///		C		
16.5-18.0	***-/-***		C	SAND, SILTY, CLAYEY, LAMINAR BANDING, MEDIUM DENSE, MOIST	
	-/-		C		
18.0	***-/-***		C		
18.0-20.0	***//oo**		C	SAND, CLAYEY, GRAVELLY, VERY DENSE, MOIST, VERY COMPACT, MEDIUM SAND, RED-BROWN,	
	***//oo**		C	SOME 1-2" GRAVEL	
	***//oo**		C		
20.0	***//oo**	20	C		
20.0-21.5	///--*///		C	CLAY, VERY SILTY, SANDY (VERY FINE), WET, SOFT, SLIGHTLYBLOCKY, BROWN	
	///--*///		C		
21.5	///--*///		C		
21.5-22.9	///***///		C	CLAY, VERY FINE, SANDY, WET, SHOWS FREE WATER IF WORKED, LAMINAR BANDING	
	///***///		C		
22.9	///***///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PRECISION ENGINEERING, INC.

PROJECT: CINIZA REFINERY

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6942.5
TOTAL DEPTH: 40.0 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.0 FEET
BORING ID: RW-5
PAGE: 2 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
22.9-24.1	///▪▪////		C	CLAY, VERY FINE, SANDY, AS ABOVE BUT LESS MOISTURE	
24.1	///▪▪////		C		
24.1-25.0	000//▪000		C	GRAVEL, CLAYEY, WET/MOIST, SOME GREATER THAN 3" SANDSTONE PIECES	
25.0	000//▪000	25	C		
25.0-28.0	////▪////		C	CLAY, SLIGHTLY FINE SANDY, WET, LAMINAR BANDING, BROWN TO RED-BROWN, STIFF	
	////▪////		C		
	////▪////		C		
	////▪////		C		
	////▪////		C		
28.0	////▪////		C		
28.0-28.6	▪▪▪▪▪▪▪▪▪▪		C	GRAVEL, FINE, DENSE, MOIST, VERY STRONG HYDROCARBON ODOR, LIGHT BROWN, SOME PEBBLES	
28.6-30.0	▪▪▪SHSH▪▪		C	SANDSTONE, SHALEY, HYDROCARBON ODOR, HARD, FRACTURED, LIGHT GREEN TO WHITE,	
	▪▪▪SHSH▪▪		C	ARGILLACEOUS	
30.0	▪▪▪SHSH▪▪	30	C		
30.0-31.0	▪▪▪SHSH▪▪		C	SANDSTONE AND SHALE PIECES, HYDROCARBON ODOR, HARD, WHITE/GREEN MOTTLED	
31.0	▪▪▪SHSH▪▪		C		
31.0-34.0	000000000		C	GRAVEL, FINE, VERY WET, WATER BEARING, DENSE	
	000000000		C		
	000000000		C		
	000000000		C		
	000000000		C		
34.0	000000000		C		
34.0-40.0	SHSH▪▪SHS		C	SHALE, SANDY, HARD, FISSLE, GREY/RED, DRY, NO ODOR	
	SHSH▪▪SHS	35	C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
	SHSH▪▪SHS		C		
40.0	SHSH▪▪SHS	40	C		
TD					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PRECISION ENGINEERING, INC.

PROJECT: Cibiza Refinery

LOG OF TEST BORINGS

FILE #: 97-070
ELEVATION: 6972.6
TOTAL DEPTH: 38.5 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.5 FEET
BORING ID: RW-6
PAGE: 1 OF 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0-5.0	/oo/o/oo/		C	Gravel, fine, clayey, moderatly dense, moist, red-brown, some pieces to 2".	
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
	/oo/o/oo/		C		
5.0	/oo/o/oo/	5.0	C		
5.0-8.0	//-•-•///		C	Clay, silty, very fine sand, red-brown, soft, wet, laminar banding.	
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///		C		
8.0	//-•-•///	8.0	C		
8.0-9.0	**********		C	Sand, fine, red-brown, moist, loose.	
9.0	**********		C		
9.0-12.5	**********		C	Sand, fine, red-brown, laminar banding, moist, some medium, mostly fine, medium	
	**********	10	C	dense.	
	**********		C		
	**********		C		
	**********		C		
	**********	12	C		
12.5	**********		C		
12.5-13.5	//////////		C	Clay, wet, brown, laminar banding, fine blocky blocky, soft.	
13.5	//////////		C		
13.5-15.0	/•••/•••/		C	Sand, fine, clayey, moist, medium dense, red-brown, laminar banding.	
	/•••/•••/		C		
15.0	/•••/•••/	15	C		
15.0-17.0	//////////		C	Clay, very fine sandy, silty, wet, soft, red-brown, laminated.	
	//////////		C		
	//////////		C		
17.0	//////////		C		
17.0-17.4	**********		C	Sand, medium, loose, light brown, moist.	
17.4-23.0	//-•-•///		C	Clay, very fine sandy, silty, wet, soft, red-brown, laminated, some	
	//-•-•///		C	thin cleaner sand.	
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///	20	C		
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///		C		
	//-•-•///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

PRECISION ENGINEERING, INC.

PROJECT: Cinaza Refinery

LOG OF TEST BORINGS

FILE #: 97-078
ELEVATION: 6972.6
TOTAL DEPTH: 38.5 FEET
LOGGED BY: WHK
DATE: 8/27/97
STATIC WATER: 31.5 FEET
BORING ID: EW-6
PAGE: 2 OF 2

DEPTH	SOIL TYPE	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
17.4-23.0	///-*-*///		C	Clay, very fine sandy, silty, wet, soft, red-brown, laminated, some thin cleaner sand.	
	///-*-*///		C		
	///-*-*///		C		
	///-*-*///		C		
	///-*-*///		C		
23.0	///-*-*///		C		
23.0-23.5	**/***/**		C	Sand, coarse, clayey, dense, red-brown, moist.	
23.5-31.5	**/*//*/*		C	Sand, clayey, fine, wet, red-brown, laminar banding, moderately dense.	
	**/*//*/*		C		
	**/*//*/*	25	C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*		C		
	**/*//*/*	30	C		
	**/*//*/*		C		
	**/*//*/*		C		
31.5	**/*//*/*		C		
31.5-33.5	**O**O***		C	Sand, gravelly, strong hydrocarbon odor, water bearing, grey-brown, dense.	
	OO***		C		
	OO***		C		
33.5	**O**O***		C		
33.5-38.5	ShShShSh		C	Shale, green-grey, sandy, hard, dry, no odor.	
	ShShShSh		C		
	ShShShSh	35	C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
	ShShShSh		C		
T.D. 38.5			C		
			C		
		40	C		
			C		
			C		
			C		
			C		
			C		
			C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 9 1/4" O.D. H.S.A.

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-16

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3797.65, W1373.78
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7674
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 25, 1998
REASON FOR CLOSURE:	POTENTIAL FOR AQUIFER CONTAMINATION

DETAIL OF CLOSURE PROCEDURE:

1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 22 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 38 CU FT
MAX INJECTION PRESSURE: 600 PSI

BORING OW-16

SURFACE ELEVATION: 6942 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

LABORATORY TEST DATA

PENETRATION RATE MINUTES/FOOT

PENETRATION RATE	SYMBOLS	DESCRIPTION
2.5	SM	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL, SOFT, HIGHLY WEATHERED
2.5		
5.0		
6.7	SS	12 FEET: SANDSTONE, RED, FINE-GRAINED, HARD, FRESH
5.0	SHALE	15 FEET: SHALE, RED, SANDY, HARD, FRESH
5.0		
5.0		
5.0		
5.0		
5.0		
10.0	SS	47 FEET: SANDSTONE, GRAY, FINE-TO MEDIUM-GRAINED, CALCAREOUS, HARD, FRESH
4.3	SHALE	50 FEET: SHALE, GRAY, SILTY, WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 54.6 FEET ON 12/2/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 44.6 TO 54.6 FEET.
GRAVEL PLACED FROM 36.0 TO 54.6 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 26.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-17

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3855.99, W1209.40
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7674
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 25, 1998
REASON FOR CLOSURE:	POTENTIAL FOR CROSS CONTAMINATION/ WELL REPLACED

DETAIL OF CLOSURE PROCEDURE:

1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 29 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 43 CU FT
MAX INJECTION PRESSURE: 525 PSI

BORING OW-17

SURFACE ELEVATION: 6941 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

LABORATORY TEST DATA

PENETRATION RATE MINUTES/FOOT

SYMBOLS		DESCRIPTION
3.0 / 3.2	SM	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE AND SANDSTONE, SOFT, HIGHLY WEATHERED
6.0	SS	11 FEET: SANDSTONE, REDDISH BROWN, FINE-GRAINED, NONCALCAREOUS, HARD, FRESH
2.9 / 5.6 / 2.8 / 3.8 / 3.2 / 3.3	SHALE	13 FEET: SHALE, REDDISH BROWN, SANDY, SOFT, FRESH GRADES HARD FROM 27.5 TO 30.0 FEET GRADES GRAY FROM 31 FEET GRADES WITH THIN LIMESTONE AND SANDSTONE INTERBEDS FROM 39 FEET
4.3	SS	40 FEET: SANDSTONE, GRAY, FINE-GRAINED, SILTY, CALCAREOUS, HARD, FRESH
5.0 / 4.3 / 5.0	SHALE	42 FEET: SHALE, GRAY, SILTY, SANDY, WITH SOME GRAVEL-SIZED FRAGMENTS OF CHERT AND LIMESTONE AND OCCASIONAL THIN INTERBEDS OF LIMESTONE, HARD, FRESH

BORING COMPLETED AT 50.0 FEET ON 1/3/81.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 38.0 TO 50.0 FEET.
GRAVEL PLACED FROM 24.0 TO 50.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 31.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

DAMES & MOORE

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-25

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3960.15, W1270.80
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7677
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 24, 1998
REASON FOR CLOSURE:	POTENTIAL FOR CROSS CONTAMINATION/ WELL REPLACED

DETAIL OF CLOSURE PROCEDURE:

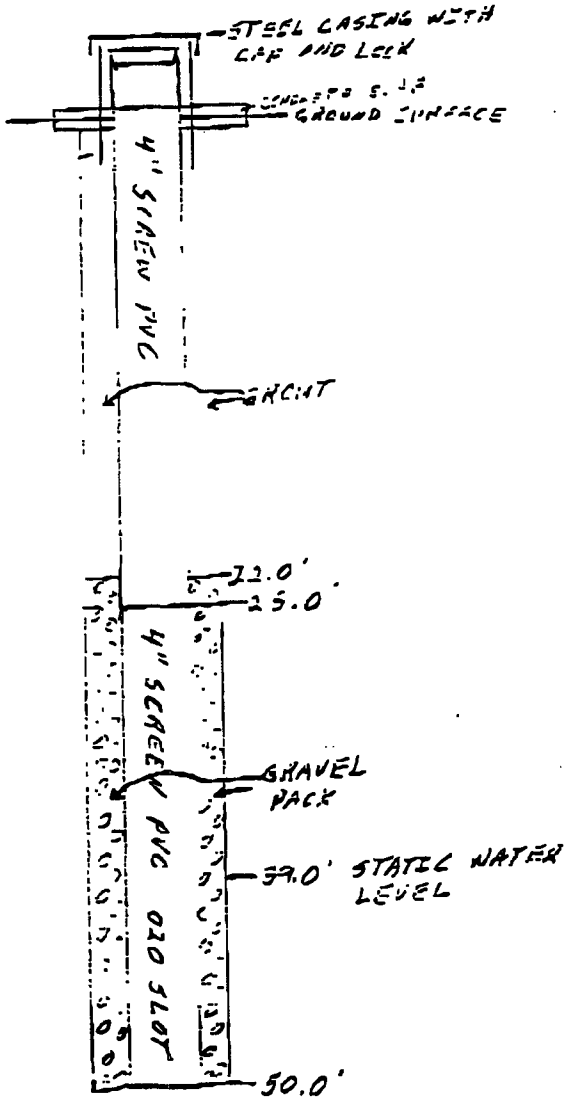
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 27 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 40 CU FT
MAX INJECTION PRESSURE: 500 PSI

CINIZA REFINERY

OW-25

DRILLED: JUNE 29, 1990



FORMATION LOG

Depth(ft)	Formations
0-7	Clay
7-25	Red sandy clay
28-37	Clay with sand layers
39-50	Sand with thin clay layers

DRILLER NOT KNOWN

WELL CLOSURE RECORD

WELL IDENTIFICATION: OW-26

LOCATION	
STATE:	NEW MEXICO
COUNTY:	McKINLEY
LOCAL COORDINATES OR TOWNSHIP AND RANGE:	PLANT LOCALS: N3730.74, W1188.93
OWNER:	GIANT REFINING COMPANY, 505-722-3833
CONTACT:	DORINDA MANCINI, ENVIRONMENTAL DEPARTM
CLOSURE COMPANY:	PRECISION ENGINEERING, INC., 505-523-7674
CONTACT:	WILLIAM H. KINGSLEY
CLOSURE DATE:	FEBRUARY 26, 1998
REASON FOR CLOSURE:	POTENTIAL FOR AQUIFER CONTAMINATION

DETAIL OF CLOSURE PROCEDURE:

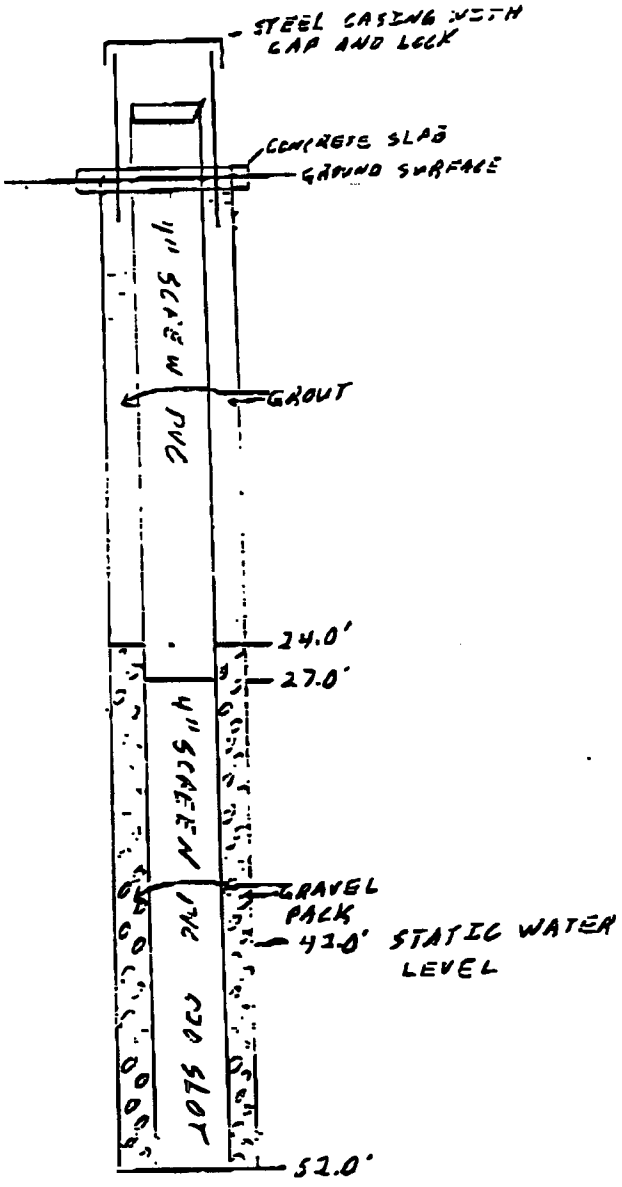
1) PULL GROUND SURFACE FINISH SET
2) SPLIT SCREEN/CASING BELOW EXISTING GROUT LINE
3) SET TREMMIE TO BOTTOM OF THE WELL
4) INJECT GROUT TO DISPLACE CONTENTS OF THE WELL TO THE SURFACE
5) CAPTURE WELL CONTENTS
6) SET PRESSURE PACKER ABOVE CASING SPLIT
7) INJECT GROUT UNDER PRESSURE TO A MINIMUM OF CALCUALTED WELL GRAVEL PACK VOLUME
8) PULL TREMMIE/PACKER AND GROUT TO SURFACE

REQUIRED GROUT VOLUME OF THIS WELL: 22 CU FT
ACTUAL GROUT VOLUME INJECTED IN THIS WELL: 35 CU FT
MAX INJECTION PRESSURE: 575 PSI

CINIZA REFINERY

OW-26

DRILLED: JUNE 29, 1990



FORMATION LOG

Depth (Ft)	Formation
0-5	clay
5-19	Red sandy clay
19-42	Red clay w/ sand layers
42-52	Sand with thin clay layers

GAMC DRILLER NOT KNOWN

FACSIMILE TRANSMITTAL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

MULTIMEDIA PERMITTING AND PLANNING DIVISION

NEW MEXICO AND FEDERAL FACILITIES SECTION

PLEASE PRINT IN BLACK INK ONLY

TO:	**Dorinda Mancini, Environmental Manager, Giant Refining**
MACHINE NUMBER: 505.722.0210	VERIFICATION NUMBER:
FROM: James A. Harris, Jr. RCRA Facility Manager/Geologist	
PHONE: (214) 665-8302	Mail Code: 6PD-N
OFFICE: New Mexico/Federal Facilities Section	PAGES, INCLUDING COVER SHEET THREE (3)
DATE: February 6, 1997	

PLEASE NUMBER ALL PAGES

INFORMATION FOR SENDING FACSIMILE MESSAGES

EQUIPMENT:	FACSIMILE NUMBER:	VERIFICATION NUMBER:
PANAFAX UF-766	(214) 665-6762	(214) 665-6760

COMMENTS

Dorinda,

FYI, please review. Let's try to go over this next week or at your convenience.

Thanx

JAMES

SWMU TRACKING LIST - GIANT REFINERY EPA ID: NMD000333211, Gallup, NM			
SWMU # now using 5/90 RFI WKPLN Designation; HSWA in ( ).	PHASE/GROUP	STATUS	COMMENTS/NOTES
6: The Tank Farm - Leaded Gasoline Tanks (3)	Phase I		Additional sampling for extent of contamination and confirmation sampling is required; completed first quarter '95
9: The Drainage Ditch near the Inactive Land Farm (10 & 13)	"		Survey Plat submitted; closure certification must be submitted prior to initiating Class III Permit Mod process
8: The Railroad Rack Lagoon (6)	"	under voluntary corrective action	monitoring requirements submitted w/quarterly status reports; notify EPA when final closure has been initiated; Survey Plat submitted; closure certification must be submitted prior to initiating Class III Permit Mod process
8: The Overflow Ditch (associated w/Railroad Rack Lagoon) (6)	"	"	"
8: The Fan Out Area (associated w/Railroad Rack Lagoon) (6)	"	"	"
10: The Sludge Pits (9)	"	"	monitoring requirements submitted w/quarterly status reports; notify EPA when final closure has been initiated

1: The Aeration Basin (1)	Phase II	soil and groundwater sampling every five years	RFI PHII RPT APP 1/94 w/modifications; Survey Plat submitted; closure certification must be submitted prior to initiating Class III Permit Mod process
2: The Evaporation Ponds (2)	"	"	Survey and closure certification must be submitted prior to initiating Class III Permit Mod process
12: Contact Waste Water Collection System (CWWCS)	"	Inspection every 5 years beginning 1996	
13: The Drainage Ditch between APIs Evaporation Ponds and the Neutralization Tank Evaporation Ponds (14)	"	soil and groundwater sampling every five years	Survey Plat submitted; closure certification must be submitted prior to initiating Class III Permit Mod process
3: Empty Container Storage Area (5)	Phase III		"
4: Old Burn Pit (8)	"		
5: Landfill Areas (7)	"	a Voluntary Corrective Action (VCA) Plan to cap the "Landfill Areas" was submitted in March 1993.	EPA approved the VCA Plan on January 5, 1994 but required that additional soil borings be completed prior to Giant proceeding with the capping activities
7: Fire Training Area (4)	"	Under VCA	
11: Secondary Oil Skimmer (11)	"	Under VCA	discolored soil is the natural color; there is no hydrocarbon staining or odors detected; reference to "black fill" sand is actually "back fill"

Prepared by: James A. Harris, Jr.\6HPW as at February 6, 1997

Price, Wayne

From: Price, Wayne
Sent: Monday, December 16, 2002 1:22 PM
To: 'Dorinda Mancini'
Subject: RE: Monitor wells

Please proceed, if possible get the info by Friday!

-----Original Message-----
From: Dorinda Mancini [mailto:dmancini@giant.com]
Sent: Monday, December 16, 2002 12:47 PM
To: 'Price, Wayne'
Cc: Ed Riege
Subject: RE: Monitor wells
Importance: High

Wayne,

The information I have collected incliudes the boring logs for the wells and the closure documentation for the wells which have been closed. I am still waiting on a narrative from Bill Kingsley regarding the sequence of events around the recovery wells and the wells inside the tank farm. Also, I will have to discuss the wells we want to close and if they are the same as we proposed in 1997.

Would you like me to FAX you the boring logs and closure docs? They have alreaqdy been faxed once and are not very clear. I will be able to forward by mail the documents in an 'unfaxed' state once I receive them from Bill. I expect to receive them by tomorrow - Fed EX'd. Also, I cannot complete my report to you until I receive Bill's letter and until I can speak with him on the proposed well closures.

Please let me know how you would like me to proceed. Sorry for the delay - we worked on this all last week after our meeting in SF.

Dorinda

-----Original Message-----
From: Price, Wayne [mailto:WPrice@state.nm.us]
Sent: Monday, December 16, 2002 10:37 AM
To: Dorinda Manncina (E-mail)
Cc: 'Eriege@giant.com'
Subject: Monitor wells

Dorinda, please find attached a list of wells that I found in the 1997 Comprehensive Facility Investigation Work Plan. Please let me know the status of these wells in your report due today. Also let me know if Giant still recommends closure of some of these wells.

<<MW list.tif>>

Sincerely:
<<...OLE_Obj...>>
Wayne Price

New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Wednesday, December 11, 2002 2:39 PM
To: 'dmancini@giant.com'
Cc: 'Eriege@giant.com'
Subject: Giant Ciniza DP GW-032

Contacts: Dorinda Manncina

Dear Ms. Mancini:

Please find enclosed a copy of the minutes of the meeting we had yesterday in Santa Fe, NM. As a result of our meeting I have the following information request.
Please provide a brief status of all recovery wells, products recovered, latest analytical, and history of these areas including any MW's that have been plugged. As discussed yesterday OCD will require frequent progress reports until time of DP submittal. Please provide this first report by Monday Dec 16, 2002.

meeting
12_10_02.doc

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

12/10/02 Meeting held with Giant-Ciniza: GW-032 Dorinda Mancina, Ed Riege, LWP, RCA, Dave Cobrain.

Minutes of meeting: OCD to require the following:

Three additional nested wells around ponds.

Investigate tank farm area near recovery wells and install French drain

Investigate around old OW-20 high PH area

Investigate past OW-29

Inspect the truck center

Find out where old OW17 was located. Now closed was inside of tank farm. Sonsall wells were closed in this area.

Prevent run-off from old pond area.

Show drainage ditches on drawings

Submit storm water plan

Giant wants to monitor only OW-11,12,14,29, 30 + MW-4

Giants wants to close OW-2&3 replace with new ones

Giant does not want to monitor OW-1,9,10 RCA wants these wells to be checked to make sure they are still under Artesia conditions.

NMED wants MW-1,4,5 SWM-4 old LTU

RCA wants pond #2 to be sampled.

Old API must be rebuilt or demonstrate it is not leaking.

Giant must complete pressure testing all plant drain lines including tank farms, etc. by June 1, 2003

Giant must complete DP submittal by Oct 1, 2003

RCA wants monthly progress report.

Issues of geological channels needs to be resolved.

LWP to spell out in DP all samples to be taken from which wells and analysis, including frequency.

Price, Wayne

From: Dorinda Mancini [dmancini@giant.com]
Sent: Tuesday, April 02, 2002 8:15 AM
To: Wayne Price (E-mail)
Cc: Dave Pavlich; Steve Morris; Susan Collins (E-
Subject: Discharge Permit Schedule
Importance: High

Mr. Price:

This note is to confirm our conversation of yesterday. I plan on sending the Spring 2001 Comprehensive Groundwater Report by early next week (4/8/02). At that time I should be able to give you a discharge permit application completion schedule. Please feel free to contact me at (505) 722-0227 if you any questions or concerns regarding these issues.

Sincerely,

Dorinda Mancini
Environmental Manager
Giant Refining Co.
Ciniza Refinery

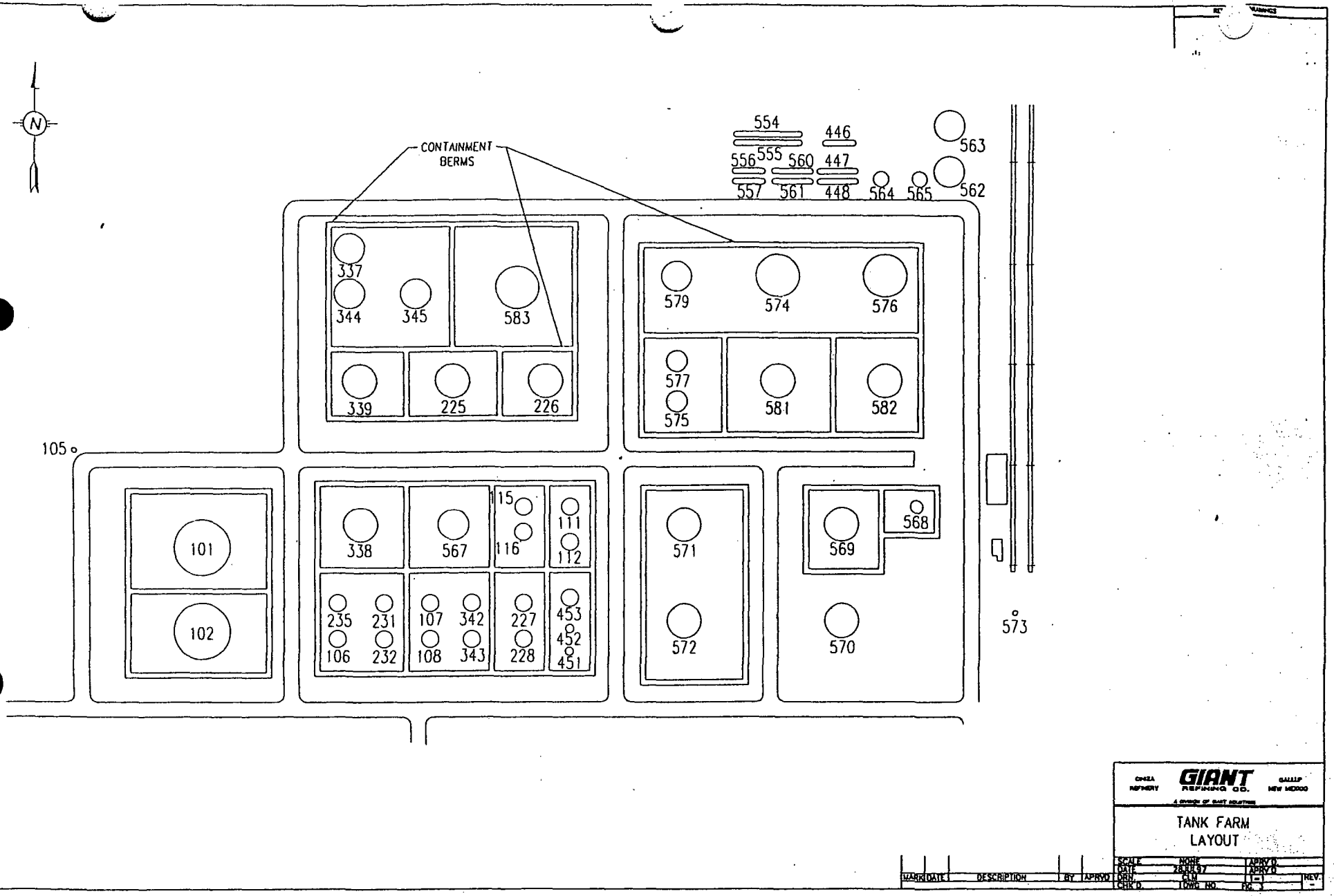
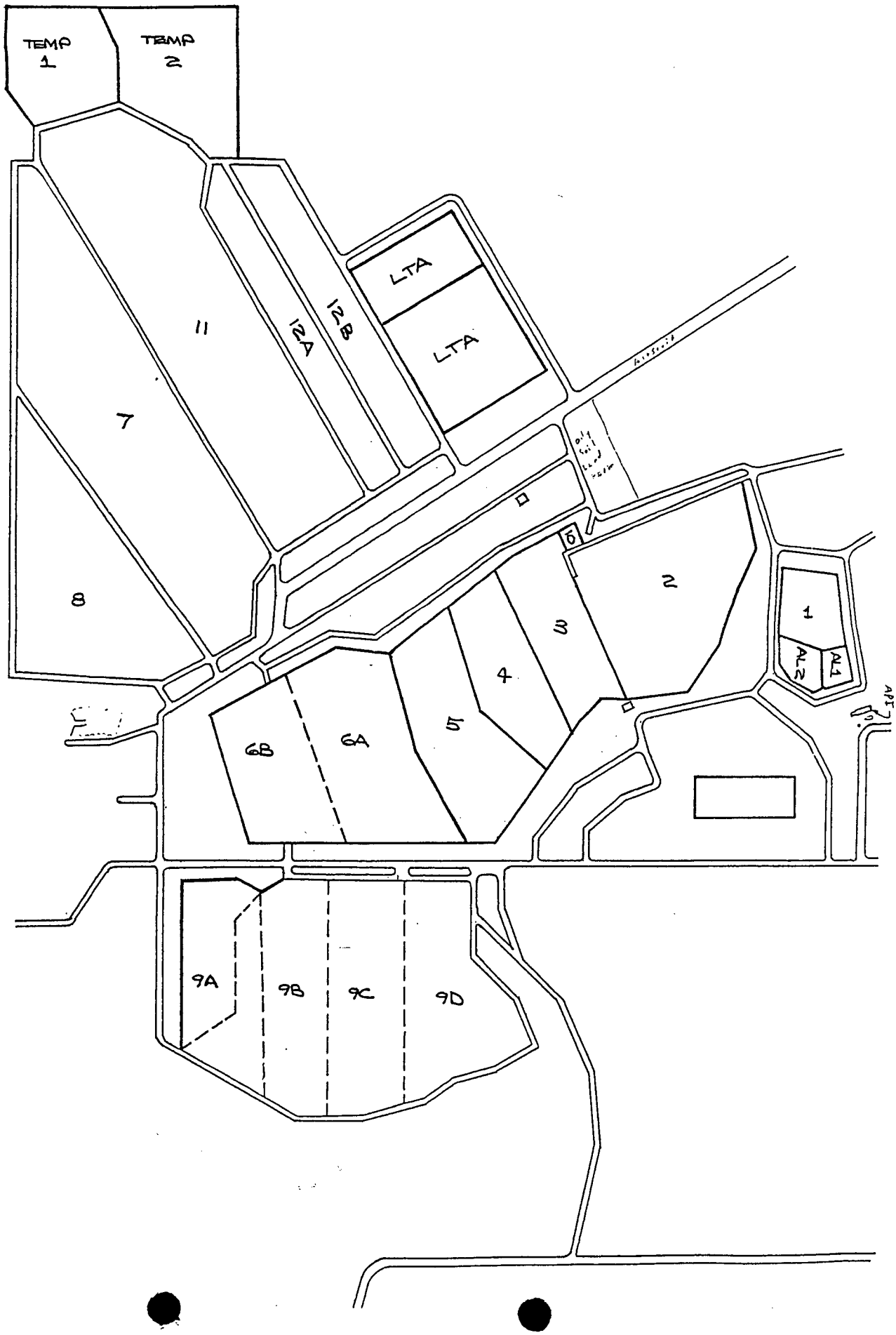


Figure 3. Map showing Giant Refining Ciniza Plant tank farm layout.


TEMP 1
TEMP 2
11
12A
12B
LTA
LTA
7
8
6
2
1
AL2
AL1
3
4
5
6B
6A
9A
9B
9C
9D

AFFIDAVIT OF PUBLICATION

Ad No. 44945

STATE OF NEW MEXICO
County of San Juan:

CONNIE PRUITT, being duly sworn says: That she is the Classified Manager of THE DAILY TIMES, a daily newspaper of general circulation published in English at Farmington, said county and state, and that the hereto attached Legal Notice was published in a regular and entire issue of the said DAILY TIMES, a daily newspaper duly qualified for the purpose within the meeting of Chapter 167 of the 1937 Session Laws of the State of New Mexico for publication on the following day(s):

Thursday, August 30, 2001.

And the cost of the publication is $197.98.

Connie Pruitt

ON 8/31/01 CONNIE PRUITT appeared before me, whom I know personally to be the person who signed the above document.

Jenny Beck

My Commission Expires April 02, 2004

cc: NMOCD

COPY OF PUBLICATION

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan applications has been submitted to the Director of the Oil Conservation Division, 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

(GW-077) - Burlington Resources, Greg Wurtz, Environmental Representative, P.O. Box 4289, Farmington, New Mexico 87499-4289, has submitted a discharge plan renewal application for their Middle Mesa Natural Gas Compressor Station located in the SW/4 SW/4 of Section 10, Township 31 North, Range 7 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 150-200 feet with an estimated total dissolved solids concentration of approximately 1400 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-239) - Burlington Resources, Greg Wurtz, Environmental Representative, P.O. Box 4289, Farmington, New Mexico 87499-4289, has submitted a discharge plan renewal application for their Quinn Natural Gas Compressor Station located in the NW/4 SW/4 of Section 16, Township 31 North, Range 8 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 250 feet with an estimated total dissolved solids concentration of approximately 1700 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-255) - Burlington Resources, Greg Wurtz, Environmental Representative, P.O. Box 4289, Farmington, New Mexico 87499-4289, has submitted a discharge plan renewal application for their Buena Vista Natural Gas Compressor Station located in the NW/4 NE/4 of Section 13, Township 30 North, Range 9 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 30 feet with an estimated total dissolved solids concentration of approximately 1100 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-258) - Burlington Resources, Greg Wurtz, Environmental Representative, P.O. Box 4289, Farmington, New Mexico 87499-4289, has submitted a discharge plan renewal application for their Cedar Hill Natural Gas Compressor Station located in the SW/4 SW/4 of Section 29, Township 32 North, Range 10 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 250 feet with an estimated total dissolved solids concentration of approximately 1100 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be

Connie Pruitt

ON 8/31/01 CONNIE PRUITT appeared before me, whom I know personally to be the person who signed the above document.

Ginny Beck

My Commission Expires April 02, 2004

cc: MPH

of Section 16, Township 31 North, Range 8 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 250 feet with an estimated total dissolved solids concentration of approximately 1700 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-255) - Burlington Resources, Greg Wurtz, Environmental Representative, P.O. Box 4289, Farmington, New Mexico 87499-4289, has submitted a discharge plan renewal application for their Buena Vista Natural Gas Compressor Station located in the NW/4 NE/4 of Section 13, Township 30 North, Range 9 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 30 feet with an estimated total dissolved solids concentration of approximately 1100 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-258) - Burlington Resources, Greg Wurtz, Environmental Representative, P.O. Box 4289, Farmington, New Mexico 87499-4289, has submitted a discharge plan renewal application for their Cedar Hill Natural Gas Compressor Station located in the SW/4 SW/4 of Section 29, Township 32 North, Range 10 West, NMPM, San Juan County, New Mexico. Natural gas products, waste oil and water is stored in above ground tanks prior to being transported off-site to OCD approved facilities. Ground water most likely to be affected in the event of an accidental discharge is at a depth of approximately 250 feet with an estimated total dissolved solids concentration of approximately 1100 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

(GW-35) - Conoco, Inc., Mr. Lane Ayers, (505)-632-4906, P.O. Box 217 Bloomfield, New Mexico 87413, has submitted a Discharge Plan Renewal Application for their San Juan Gas Plant located in the NW/4 NW/4, Section 14, Township 29 North, Range 11 West, NMPM, San Juan County, New Mexico. Approximately 790,950 gallons per month of waste water is discharged onsite into an above ground bermed closed top tank and two double lined surface evaporation ponds with leak detection prior to transport offsite at an approved OCD disposal facility; Groundwater most likely to be affected by a spill, leak, or accidental discharge to the surface is at a depth of approximately 15 to 55 feet with a total dissolved solids concentration of approximately 4,400 mg/L. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 21st day of August 2001.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

SEAL

LORI WROTENBERY, Director

Legal No. 44945, published in The Daily Times, Farmington, New Mexico, Thursday, August 30, 2001.

THE SANTA FE
NEW MEXICAN
Founded 1849

NEW MEXICO OIL CONSERVATION DIVISION
ATTN: WAYNE PRICE
1220 S. ST. FRANCIS DRIVE
SANTA FE, NM 87505

AD NUMBER: 224378 ACCOUNT: 56689
LEGAL NO: 69935 P.O.#: 02199000249
734 LINES 1 time(s) at $ 323.54
AFFIDAVITS: 5.25
TAX: 20.55
TOTAL: 349.34

AFFIDAVIT OF PUBLICATION

STATE OF NEW MEXICO
COUNTY OF SANTA FE

I, MM Weideman being first duly sworn declare and say that I am Legal Advertising Representative of THE SANTA FE NEW MEXICAN, a daily newspaper published in the English language, and having a general circulation in the Counties of Santa Fe and Los Alamos, State of New Mexico and being a Newspaper duly qualified to publish legal notices and advertisements under the provisions of Chapter 167 on Session Laws of 1937; that the publication #69935 a copy of which is hereto attached was published in said newspaper 1 day(s) between 08/30/2001 and 08/30/2001 and that the notice was published in the newspaper proper and not in any supplement; the first publication being on the 30 day of August, 2001 and that the undersigned has personal knowledge of the matter and things set forth in this affidavit.

/S/ MM Weideman
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this
30 day of August A.D., 2001

Notary Laura E. Harding

Commission Expires 11/23/03

Approved
W.P. 9/14/01

NOTICE OF PUBLICATION

STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan applications has been submitted to the Director of the Oil Conservation Division, 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

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1100 mg/l. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

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(GW-28) - Navajo Refining Company, Darrell Moore, (505) 746-5281, P.O. Box 159, Artesia, New Mexico, 88211-0159 has submitted an application for renewal of its previously approved discharge plan for the Artesia Refinery located in the SE/4 of Section 1, E/2 of Section 8, W/2 of Section 9, N/2 of Section 12, Township 17 South, Range 26 East, NMPM, Eddy County, New Mexico. Approximately 400,000 gallons per day of treated refinery waste water with a total dissolved solids concentration of approximately 2,300 mg/l is discharged from the facility waste water treatment plant by pipeline to two Class I (non-hazardous) deep injection wells located in Sec 31- Ts 17s-R 28 e and Sec 12-Ts 18s-R27e of Eddy County, New Mexico and discharges approximately 150,000 gallons per day of Reverse-Osmosis Reject water used to irrigate two adjacent farms owned and operated by Navajo Refining Company. Ground water most likely to be affected by an accidental discharge in the refinery area is at a depth of approximately [redacted] feet with a total dissolved solids concentration of approximately 2,500 mg/l, and in the pond area ground water is at a depth of 5 to 10 feet with a total dissolved solids concentration of approximately 6,000 mg/l. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed including methods and procedures for handling products, waste, waste water management, and site investigation/ abatement plans.

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Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 21st day of August 2001.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
LORI WROTENBERY, Director
Legal #69935
Pub. August 30, 2001

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

Att: Lydia Rangel FAX # 505-722-5750

Please publish the attached notice one time only upon receipt of this request. Upon notification, please send the following to this office:

1. Publisher's affidavit
2. Invoice. Our purchase order number is: 02199000222

Please publish not later than August 31, 2001.
If you have any questions, please e-mail me or phone (505)-476-3487.

Thank you.

Wayne Price- Oil Conservation Div.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

NOTICE OF PUBLICATION

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Lori Wrotenbery
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STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

SEAL

LORI WROTENBERY, Director

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

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STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

for LORI WROTENBERY, Director

TO: Wayne Price, OCD
Denny Foust, OCD, Aztec, NM
Dave Cobrain, NMED, HMB

FROM: Dorinda Mancini, Environmental Manager
Ciniza Refinery, Giant Refining Co.

RE: Groundwater Sampling for GW 032 Permit Renewal

Listed below are the wells we intend to monitor in Spring 2001. In case we have equipment or weather problems, I am going to list them in the order of highest priority through lowest.

Very High – OW -1, OW – 2, OW – 3
OW - 29, OW – 30
OW – 12, OW –13, OW – 14 (for OCD permit)

High - OW – 5, OW –7, OW – 9, OW – 10 DO NOT SAMPLE
OW – 11, MW – 4

Lower - MW –1, MW – 2, MW – 5, SMW – 4

For all wells:

- Sample for the parameters listed in Tables E-1A through E-1D as given in the RCRA Post-Closure Permit, Volume 1, Section E. (Includes Modified Skinner and additional parameters using Methods 8260, 8270, and metals.) Copy attached. (See Note 1).

- Sample for the parameters needed to do a Cation/Anion Balance –
  Anions: Alkalinity (including Bicarb, Carb and Hydroxide Alkalinity), Chloride, Fluoride, Nitrate as N, Sulfate, Phosphate as P, Bromide.
  Cations: Aluminum, Calcium, Potassium, Magnesium, Sodium, Copper, Iron, Manganese, Zinc, Boron.

- On the Chain of Custody, request a calculated Ion Balance.

- Sample and analyze for pH and Conductivity (4 replicate analyses each).

- Sample and analyze for Total Dissolved Solids and Total Suspended Solids.

- Sample and analyze for Total Organic Carbon (TOC) and Total Halides (TOX) (4 replicate analyses each)

For Wells OW – 12, -13, -14, -29, -30

- Sample and analyze for MTBE

Note 1 – Copy to be faxed

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 2/09/01

or cash received on _____ in the amount of $ 50.25

from GIANT

for CINIZA REFINERY GW-032

(Facility Name) (DP No.)

Submitted by: GIANT INDUSTRIES INC. Date: 3/2/01

Submitted to ASD by: WAYNE PRICE Date: 3/2/01

Received in ASD by: [signature] Date: 3/2/01

Filing Fee ✓ New Facility ___ Renewal ___

Modification ___ Other _____

(specify)

Organization Code 521.07 Applicable FY 2001

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

GIANT INDUSTRIES, INC. & SUBSIDIARIES

23733 N. Scottsdale Rd.
Scottsdale, Arizona
85255-9969

480
585-8888

09-Feb-01
Date

Bank of America
Bank of America
North Carolina

[redacted]
66-19
530

Valid For 180 Days From Date of Issue

[redacted] $ *******50.00
Check No. Amount

Pay ***FIFTY AND 0/100 DOLLARS***

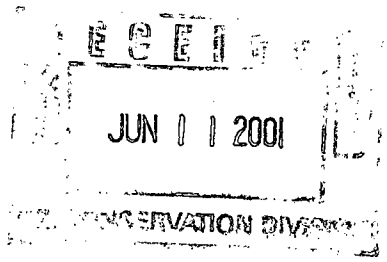
To the Order of NMED-WATER QUALITY MANAGEMENT
2040 SOUTH PACHECO STREET
SANTA FE, NM 87505

James S Acridge

GW-032

[redacted]

GIANT
REFINING COMPANY



June 6, 2001

Don Beardsley
NMED – Solid Waste Bureau
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502-6110

RE: Ciniza Refinery Non-Hazardous Waste Disposal

Dear Mr. Beardsley:

Giant Refining Co.'s (GRC) Ciniza Refinery would like to dispose of the following waste at the Red Rocks Landfill:

- **Elemental Sulfur** –This material is produced in the Sulferox Unit, which treats refinery-produced fuel gas to remove sulfur. The material is RCRA Non-hazardous and is listed as ' Subsection D.(1)i ' waste under OCD Rule 712. (19.15.9.712.). We base the non-hazardous determination on the MSDS (enclosed) and knowledge of process.

  Due to the concerns of our transporter and the landfill, we are requesting a letter stating that we have your approval to ship and dispose of this material at the Red Rocks Landfill. By reference to Rule 712, we believe that OCD does not require testing before disposal.

We look forward to hearing from you regarding approval to send this routine, non-hazardous waste to the Red Rocks Landfill. Please do not hesitate to contact me at 505-722-0227. Thank you for your assistance.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

cc: Dave Pavlich, Environmental Supt., Giant Industries, Inc.
Matt Davis, General Manager, Giant Industries, Inc.
Steve Morris, Environmental Coordinator, Ciniza Refinery
Joe Murrietta, Executive Director, NWNM Regional Solid Waste Authority
Wayne Price, OCD, Santa Fe, NM
Denny Foust, OCD, District III, Aztec, NM

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

GIANT REFINING, CO.

MATERIAL SAFETY DATA SHEET

SUBSTANCE IDENTIFICATION

Substance: **SulFerox-Produced Sulfur** (as indicated on label)

Date Sheet Prepared: October 22, 1991

NFPA Rating (Scale 0 - 4): Health = 2 Fire = 1 Reactivity = 0

1. **INGREDIENTS:**
(Include CAS Numbers and Typical Percentages)

Sulfur:	80%	CAS # 7704-34-9
Water:	20%	CAS # 7732-18-5
Proprietary Iron Chelate:	1700 ppm	

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). For information required by other federal laws, see Section 9. In addition, other substances not "hazardous" per this OSHA Standard may be listed. Where a proprietary ingredient shows, the identity may be made available as provided in this standard.

2. **PHYSICAL DATA:**

Boiling Point:	832°F (445°C)
Vapor Pressure:	1 mm Hg @ 184°C
Vapor Density:	Air=1
Solubility in Water:	Insoluble
Specific Gravity:	2.07
Freezing Point:	Optional
Appearance:	Light Yellow Particles
Odor:	Natural Gas, Sulfur

3. **FIRE AND EXPLOSION HAZARD DATA:**

Flash Point: 405°F (207°C)

Flammable Limits: Not Determined

Extinguishing Media: __X__ Water Fog __X__ Foam _____ CO_2
__X__ Dry Chemical _____ Other (Specify)

Fire and Explosion Hazards:

Avoid contact with heat, sparks, flames, or other sources of ignition. Finely divided material is extremely flammable and may burn rapidly with flare-burning effects.

Fire Fighting Equipment:

Self-contained breathing apparatus with full facepiece operated in pressure demand or other positive pressure mode.

4. REACTIVITY DATA:

Stable under normal temperatures and pressures.

Stability: (Conditions to avoid) not available.

Incompatibility: (Specific materials to avoid) not available.

Hazardous Decomposition Products: Thermal decomposition products may include toxic oxides of sulfur.

Hazardous Polymerization:

_____	Not Applicable
__X__	Will Not Occur
_____	Will Occur Under Which Conditions
_____	Under Normal Operating Conditions

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

Action to take for spills and leaks:

Shut off ignition sources. Do not touch material. Use a clean shovel and place material into a clean, dry container, and cover. No smoking and isolate from flames or flares in hazardous areas. Keep unnecessary personnel away.

DISPOSAL METHOD:

6. HEALTH HAZARD DATA:

Eyes:	Irritant! May cause irritation, inflammation, and pain.
Skin Contact:	Irritant! May cause irritation, redness, and pain. Sensitivity to sulfur when used as a topical agent is rare. May cause dermatitis.
Skin Absorption:	
Ingestion:	175 mg/kg oral in rabbit.
Inhalation:	May inflame nasal mucosa which may lead to hyperplasia.

7. **FIRST AID:**

Eyes:	Wash eyes immediately with large amounts of water or normal saline solution. Occasionally lifting the upper and lower eyelids until no evidence of chemical remains.
Skin:	Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains, approximately 15 to 20 minutes. Get medical attention immediately.
Ingestion:	Treat symptomatically and supportively. Get medical attention immediately. If vomiting occurs, keep head lower than hips to prevent aspiration.
Inhalation:	Remove from exposure area to fresh area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention.

NOTE TO PHYSICIAN: OPTIONAL

8. **HANDLING PRECAUTIONS:**

Exposure Guideline(s)

Ventilation:	Avoid breathing dusts.
Respiratory Protection:	Use properly ventilated areas.
Skin Protection:	Wear appropriate protective clothing. Avoid skin contact. Wear impervious gloves.
Eye Protection:	Wear splash-proof and dust-proof safety goggles to prevent eye contact with this substance.

9. **SARA 313 INFORMATION:**

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NON-PROPRIETARY INGREDIENTS:

None.

PROPRIETARY INGREDIENTS (Listed by SARA 313):

None.

Price, Wayne

[redacted]

From: Dorinda Mancini[SMTP:dmancini@giant.com]

Sent: Wednesday, February 07, 2001 9:30 AM

To: 'Wayne Price'; 'Dave Cobrain'; 'dfoust@state.nm.us'

Cc: Dave Pavlich; Dorinda Mancini; Steve Morris

Subject: Groundwater Sampling

After checking the WQCC list of standards, Giant will ensure that all required parameters are sampled and analyzed for with our Spring 2001 sampling. There are a few that we had not listed on the Tables E-1A through E-1D.

Wayne and Denny -
Are PCB's and Radioactivity required if there is no reason to believe them to be present in our groundwater?
If we need these parameters, would analyzing a few select (perimeter) wells suffice?

Thanks,
Dorinda

Price, Wayne

From: Dorinda Mancini[SMTP:dmancini@giant.com]

Sent: Friday, January 26, 2001 2:50 PM

To: 'Price, Wayne'

Cc: Dave Pavlich; Steve Morris; Dorinda Mancini

Subject: RE: OCD GW 032 Permit Renewal Application

Thanks for the timely response. We will have the application and fee to you before 4/1/01.

Dorinda

> -----Original Message-----
> From: Price, Wayne [SMTP:WPrice@state.nm.us]
> Sent: Friday, January 26, 2001 9:39 PM
> To: 'Dorinda Mancini'
> Subject: RE: OCD GW 032 Permit Renewal Application
>
> Dear Ms. Mancini:
>
> Please note GW-032 is due to expire on Aug 01,2001.
>
> WQCC 3106.F. If the holder of an approved discharge plan submits an
> application for discharge plan renewal at least 120 days before the
> discharge plan expires, and the discharger is not in violation of the
> approved discharge plan on the date of its expiration, then the existing
> approved discharge plan for the same activity shall not expire until the
> application for renewal has been approved or disapproved. A discharge plan
> continued under this provision remains fully effective and enforceable. An
> application for discharge plan renewal must include and adequately address
> all of the information necessary for evaluation of a new discharge plan.

> > items

> > over the last year.

> >

> > Dorinda Mancini

> > Ciniza Environmental Manager

> >

Price, Wayne

From: Price, Wayne

Sent: Friday, January 26, 2001 2:38 PM

To: 'Dorinda Mancini'

Subject: RE: OCD GW 032 Permit Renewal Application

Dear Ms. Mancini:

Please note GW-032 is due to expire on Aug 01,2001.

WQCC 3106.F. If the holder of an approved discharge plan submits an application for discharge plan renewal at least 120 days before the discharge plan expires, and the discharger is not in violation of the approved discharge plan on the date of it expiration, then the existing approved discharge plan for the same activity shall not expire until the application for renewal has been approved or disapproved. A discharge plan continued under this provision remains fully effective and enforceable. An application for discharge plan renewal must include and adequately address all of the information necessary for evaluation of a new discharge plan. Previously submitted materials may be included by reference provided they are current, readily available to the secretary and sufficiently identified to be retrieved. [12-1-95]

In order to comply with your request please submit a Discharge Plan renewal application with $50.00 filing fee for the above listed facilities before April 01, 2001.

From: Dorinda Mancini[SMTP:dmancini@giant.com]

Sent: Friday, January 26, 2001 1:16 PM

To: 'Wayne Price'

Subject: OCD GW 032 Permit Renewal Application

Wayne,

Price, Wayne

From: Dorinda Mancini[SMTP:dmancini@giant.com]

Sent: Friday, January 26, 2001 2:50 PM

To: 'Price, Wayne'

Cc: Dave Pavlich; Steve Morris; Dorinda Mancini

Subject: RE: OCD GW 032 Permit Renewal Application

Thanks for the timely response. We will have the application and fee to you before 4/1/01.

Dorinda

> -----Original Message-----
> From: Price, Wayne [SMTP:WPrice@state.nm.us]
> Sent: Friday, January 26, 2001 9:39 PM
> To: 'Dorinda Mancini'
> Subject: RE: OCD GW 032 Permit Renewal Application
>
> Dear Ms. Mancini:
>
> Please note GW-032 is due to expire on Aug 01,2001.
>
> WQCC 3106.F. If the holder of an approved discharge plan submits an
> application for discharge plan renewal at least 120 days before the
> discharge plan expires, and the discharger is not in violation of the
> approved discharge plan on the date of its expiration, then the existing
> approved discharge plan for the same activity shall not expire until the
> application for renewal has been approved or disapproved. A discharge plan
> continued under this provision remains fully effective and enforceable. An
> application for discharge plan renewal must include and adequately address
> all of the information necessary for evaluation of a new discharge plan.

> > items

> > over the last year.

> >

> > Dorinda Mancini

> > Ciniza Environmental Manager

> >

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2044 A Galisteo Street
Santa Fe, New Mexico 87505
Telephone (505) 827-1561
Fax (505) 827-1544

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

PAUL R. RITZMA
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

December 22, 2000

Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: SURVEY PLAT AND DEED NOTIFICATION RECEIPT
REQUEST FOR EXTENSION, REVEGETATION SCHEDULE
LAND TREATMENT UNIT, GIANT REFINING COMPANY
CINIZA REFINERY
PERMIT NUMBER NMD000333211-1

Attention: Ms. Dorinda Mancini:

This letter acknowledges receipt by the New Mexico Environment Department Hazardous Waste Bureau (HWB) of the deed notification and survey plat for the Land Treatment Unit (LTU) at Giant Refining Company's Ciniza Refinery (GRCC) dated November 20, 2000. The submittal satisfies requirements specified in Section III.D.1 of the Resource Conservation and Recovery Act (RCRA) Land Treatment Unit Post-closure Care Permit issued by HWB to GRCC in August 2000. The survey plat and deed notification were submitted to HWB in accordance with the requirements of 20.4.1.500 NMAC incorporating 40 CFR 264.116 and 264.119.

Giant also requested an extension to complete establishment of the final vegetative cover for the LTU as part of their submittal dated November 20, 2000. A vegetative cover for the LTU was to be completed within 90 days of the effective date of the Post-closure Care Permit. The extension was requested because seasonal weather conditions at the facility will inhibit the growth of the vegetative cover. HWB grants an extension to begin establishment of the final vegetative cover for the LTU no later than May 1, 2001.

Price, Wayne

From: Price, Wayne

Sent: Tuesday, November 28, 2000 2:13 PM

To: 'Dorinda Mancini'

Subject: RE: Railroad Rack Lagooln and Landfarm Sampling

Approved! Please send analyticals with landfarm layout for OCD approval!

From: Dorinda Mancini[SMTP:dmancini@giant.com]

Sent: Tuesday, November 28, 2000 11:48 AM

To: 'Wayne Price'; 'Dave Cobrain'; 'dfoust@state.nm.us'

Cc: Dave Pavlich; Steve Morris

Subject: Railroad Rack Lagooln and Landfarm Sampling

Wayne,

This is the schedule for sampling and the parameters I believe we agreed upon during our phone conversation last week:

Bill Kingsley of Precision Engineering will be at Ciniza the week of 12/4/00 to do the drilling.
We will sample and analyze the temporary landfarm, 3 feet below the treatment zone of the landfarm, and the lagoon sludge for 8260, 8270, total RCRA metals (8), DRO, GRO, and ORO.

In addition. the sample from 3 feet below the landfarm treatment zone will be analyzed for General Chemistry parameters.

Let me know if this matches your recollection.

Will add to GP. 8/25/00

GIANT
REFINING COMPANY

August 31, 2000

SEP - 5 2000

Mr. Wayne Price
Environmental Bureau
New Mexico Oil Conservation Division
2040 S. Pacheco St.
Santa Fe, NM 87595

RE: Giant Refining Company – Ciniza Refinery
Minor Modification of GW – 032
Construction of a Temporary Landfarm to Bioremediate Non-Hazardous Soils Excavated from Solid Waste Management Units (SWMUs) 8 and 11

Dear Mr. Price:

Giant's Ciniza Refinery requests a minor Modification to it's Groundwater Discharge Plan (GW – 032) to construct a temporary landfarm adjacent to the Railroad Rack Lagoon (RRR Lagoon). The landfarm would be located west of the Lagoon and would be ~300 feet by ~70 feet in size. The landfarm is marked in red on the attached map.

This landfarm would be used to bioremediate non-hazardous, hydrocarbon-contaminated soils excavated from the adjacent RRR Lagoon (SWMU 8) and from the Secondary Oil Skimmer (SWMU 11). Approximately 1000 cu. yd. of soil is expected to need treatment. Giant estimates that remediation of all the soils would require 3 to 4 years.

Treatment in the landfarm would consist of adding 6" lifts of contaminated soil to a base of clean soil, plowing, disking and tilling the soil along with addition of a time-release fertilizer (MaxBact) and water as needed. Sampling to monitor the reduction of TPH would be done at least quarterly. When the TPH is at an acceptable level for other, beneficial use on the site, it would be removed and used or stockpiled for future fill needs.

Thank you for your assistance in this matter. If you have any questions regarding this request , please contact me at (505) 722-0227.

Sincerely,

Dorinda Mancini

Dorinda Mancini
Environmental Manager, Ciniza Refinery

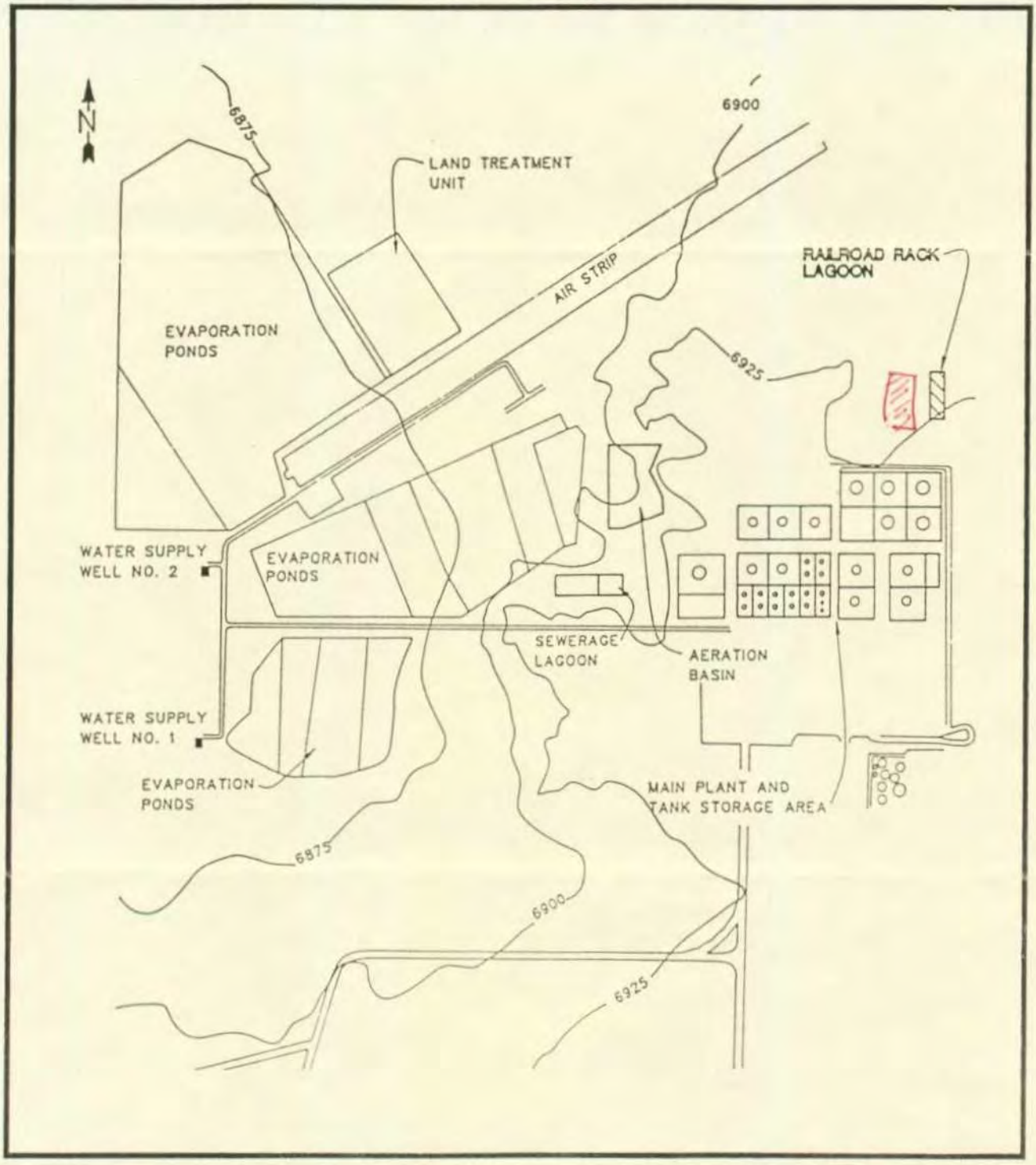
cc: Denny Foust, OCD Aztec Office
Dave Cobrain, NMED, HMB

ENV/Minor Mod to GW 032 – Temp Landfarm

PHONE
505-722-3833
FAX
505-722-0210

ROUTE 3
BOX 7
GALLUP
NEW MEXICO
87301

Figure No. 1
Railroad Rack Lagoon Area
Cenizo Refinery



State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous and Radioactive Materials Bureau
2044 A Galisteo Street
Santa Fe, New Mexico 87505
Telephone (505) 827-1557
Fax (505) 827-1544

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

PAUL R. RITZMA
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUIRED

March 23, 2000

Ms. Dorinda Mancini
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: POST-CLOSURE CARE PERMIT, LAND TREATMENT UNIT
GIANT REFINING COMPANY, CINIZA REFINERY
McKINLEY COUNTY, NEW MEXICO

Dear Ms. Mancini:

This letter provides a tentative schedule for issuing a Resource Conservation and Recovery Act (RCRA) Post-closure Care Permit for the land treatment unit (LTU) at Giant Refining Company's (Giant's) Ciniza Refinery. The LTU is a regulated unit therefore, Giant is required to obtain a permit for post-closure care activities by the State of New Mexico Environment Department (NMED) and the U.S. Environmental Protection Agency (EPA) in compliance with Subtitle C of RCRA, 42 U.S.C. 6901 et seq., the New Mexico Hazardous Waste Act (HWA), NMSA 1978, 74-4-1 et seq. and the New Mexico Hazardous Waste Regulations, 20 NMAC 4.1.

Giant's revised post-closure care permit application was delivered to NMED Hazardous and Radioactive Materials Bureau (HRMB) on March 20, 2000. HRMB determined that further edits were required. The edits were completed and delivered to HRMB by Giant Refining Company's contractor Benchmark Environmental Corporation on March 22, 2000. HRMB anticipates that the final review of the draft permit application will be completed by March 31, 2000. The permit and revised permit application will then be submitted to EPA for review and comment by April 3, 2000. HRMB will incorporate EPA's comments and issue a draft permit for public comment in accordance with 20 NMAC 4.1.901. HRMB anticipates that the 45-day public comment period, required by 20 NMAC 4.1.901, will begin prior to April 30, 2000. Based on the anticipated schedule for review and public comment and the assumption that a public hearing will not be required, the final Post-closure Care Permit for the LTU at Giant Refining Company's Ciniza Refinery could be issued by June 30, 2000.

Please call this office at (505) 827-1561 if you have questions regarding the anticipated schedule for issuance of the post-closure care permit for the subject site listed above.

Sincerely,

David Cobrain
Project Leader
Hazardous and Radioactive Materials Bureau

cc: James P. Bearzi, NMED HRMB
John E. Kieling, NMED HRMB
Robert S. Dinwiddie, HRMB
Wayne Price, NMOCD
Pam Young, HRMB

file: Red/GRCC/00
Track: GRCC/Mancini/Cobrain/03-23-00/schedule PCC permit

Price, Wayne

From: Price, Wayne
Sent: Thursday, March 02, 2000 3:31 PM
To: 'Dorinda Mancini'
Subject: RE: Extension for Report

APPROVED

From: Dorinda Mancini[SMTP:dmancini@giant.com]
Sent: Thursday, March 02, 2000 1:29 PM
To: Price, Wayne
Cc: Dave Pavlich; Steve Morris
Subject: Extension for Report

Wayne,

Just a follow up note to our phone conversation of 2/25/00. I requested an extension to 3/17/00 to send the report on the "free product" area and the history of BTEX results from the wells at the Ciniza Refinery. Roger and you agreed to my proposal for the extension. Thank you for your assistance. Let me know if you need any more information.

Dorinda Mancini
Environmental Manager
Ciniza Refinery

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 14, 1998

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-051

Ms. Dorinda Mancini
Environmental Manager
Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

RE: Comprehensive Facility Investigation Work Plan
Ciniza Refinery
Discharge Plan GW-032
McKinley County, New Mexico

Dear Ms. Mancini:

The New Mexico Oil Conservation Division has received the request dated April 2, 1998 for an extension until July 15, 1998 to submit the additional information for the Facility Investigation Work Plan. The original due date for submission was April 16, 1998. Based on the information provided, the extension **is hereby approved.**

If you have any questions, please contact Mark Ashley at (505) 827-7155.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/mwa
xc: OCD Aztec Office

P 288 259 051

US Postal Service
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Do not use for International Mail *(See reverse)*

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Special Delivery Fee	
Restricted Delivery Fee	
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Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

January 4, 2000

CERTIFIED MAIL
RETURN RECEIPT NO. Z 142 564 921

Ms. Dorinda Mancini
Environmental Manager
Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

RE: Comprehensive Facility Investigation Work Plan
Ciniza Refinery
Discharge Plan GW-032
McKinley County, New Mexico

Dear Ms. Mancini:

The Comprehensive Facility Investigation Work Plan for the Ciniza Refinery was due on July 15, 1998, as of this date the New Mexico Oil Conservation Division (NMOCD) does not have any record of receiving this information. Please submit the information requested in the attached letter (Ashley-Mancini) dated February 16, 1998. Please submit by February 29, 2000.

If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155).

Sincerely Yours,

Wayne Price

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

cc: OCD Aztec office
NMED-HRMB

attachments-letter dated 2/16/98

GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505.
722.3833

April 2, 1998

Mr. Roger Anderson
Environmental Bureau Chief
New Mexico Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

RE: Extension Request For Comprehensive Facility Investigation Work Plan
Discharge Plan GW - 32

Dear. Mr. Anderson:

Giant Refining's Ciniza Refinery received a request from the Oil Conservation Division (OCD), dated February 16, 1998, for additional information for the Facility Investigation Work Plan. This information is due to the OCD on April 16, 1998.

Due to the required preparation of Ciniza's RCRA Part B Permit renewal application and preparations for the scheduled plant "turn around", Ciniza's Environmental group has been unable to prepare the documents requested. I am requesting a 90 day extension (until July 15, 1998) to submit the additional information to your office.

Thank you for your assistance. If you have questions or comments regarding this request, please contact me at (505) 722-0227.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

cc: Denny Foust, NMOCD - Farmington
Steve Morris, Environmental Specialist
Dave Pavlich, HSE Manager

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 16, 1998

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-018

Ms. Dorinda Mancini
Environmental Manager
Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

RE: Comprehensive Facility Investigation Work Plan
Ciniza Refinery
Discharge Plan GW-032
McKinley County, New Mexico

Dear Ms. Mancini:

The New Mexico Oil Conservation Division (OCD) has completed a review of the Giant Refining Company (Giant) "Comprehensive Facility Investigation Work Plan" received July 1, 1997. This document contains Giant's plan to plug numerous existing refinery monitor wells and replace them with several boundary wells.

The above referenced work plan does not plan to determine the extent of soil and ground water contamination at the refinery as required by the OCD in a letter to Giant dated February 28, 1997. Pursuant to the OCD letter dated February 28, 1997, please submit a comprehensive facility investigation work plan that will determine the extent of soil and ground water contamination at the refinery. Please refer to Water Quality Control Commission Regulation 4106.C in the preparation of the work plan.

In order for the OCD to properly evaluate the work plan, the OCD also requires that Giant submit the following additional information:

1. A tabular summary of all past and present laboratory analytic results of water quality and remediation system sampling for all monitor and recovery wells.

2. A current water table potentiometric map for the refinery using the water table elevations from all monitor and recovery wells.

3. A current product thickness map for the refinery using product thickness measurements from all monitor and recovery wells.

Please submit the above mentioned work plan to the OCD by April 16, 1998.

If you have any questions, please call me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: Aztec OCD District Office
Steve Pullen, NMED-HRMB

P 288 259 018

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail *(See reverse)*

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Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

CERT. MAIL NO. P-410-431-400

☒ Telephone ☐ Personal	Time 10:15 AM	Date 6-6-97

Originating Party	Other Parties
Darinda Mancini - Giant Refining Gallup- Ciniza GW-032	Pat Sanchez NMOCD.

Subject: Discharge Plan Application Form and Guidelines (Revised 12/95 version)

Discussion

Ms. Mancini requests that the OCD provide Giant with a copy of the latest version of discharge plan guidelines and application form.

Conclusions or Agreements

OCD (Pat Sanchez) agreed to mail Giant Ciniza GW-032 the 12/95 version of Guidelines and application form.

Distribution: File, Giant - Ms. Mancini

Signed: Patricia W. Sanchez

P 410 1 1 400

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Street & Number DP. Guidelines & App. form.	
Post Office, State, & ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

GIANT
INDUSTRIES, INC.
& SUBSIDIARIES

[redacted]

P.O. Box 12999
Scottsdale, Arizona
85267

602
585-8888

Bank # : [redacted]
Vendor # : 74768

Check # [redacted]
Check Date: 05-Aug-96

Div#	Inv. Date	Voucher	Invoice Number	Gross	Discount	Net
08	15-Jul-96	1562229	STMT0796	3,960.00		3,960.00

GW 32 Cmiya Ref

Total: 3,960.00

ACKNOWLEDGEMENT OF RECEIPT
OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 8/5/96

or cash received on ______________ in the amount of $ 3960.00

from Giant Industries

for Ciniza Ref (Facility Name) GW-032 (DP No.)

Submitted by: ______________ Date: ______________

Submitted to ASD by: [signature] Date: 8/22/96

Received in ASD by: [signature] Date: [illegible]

Filing Fee ____ New Facility ____ Renewal X OK

Modification ~~X~~ Other ______________ (specify)

Organization Code 521.07 Applicable FY 97

To be deposited in the Water Quality Management Fund.

Full Payment X or Annual Increment ____

[redacted]

GIANT
INDUSTRIES, INC.
& SUBSIDIARIES

P.O. Box 12999
Scottsdale, Arizona
85267

602
585-8888

The Chase Mahattan Bank, N.A.
6040 Tarbell Road
Syracuse, New York 13206

05-Aug-96
Date

[redacted]
Check No.

$ *****3960.00
Amount

Pay ***THREE THOUSAND NINE HUNDRED SIXTY AND 0/100 DOLLARS***

To the Order of NEW MEXICO OIL CONSERVATION
DIVISION
P.O. BOX 1980
HOBBS, NM 88241

[signature]

[redacted]

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

AZTEC DISTRICT OFFICE
1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO 87410
(505) 334-6178 Fax (505)334-6170

GARY E. JOHNSON
GOVERNOR

JENNIFER A. SALISBURY
CABINET SECRETARY

August 15, 1996

Mr David J Acosta
County of McKinley
PO Box 70
Gallup NM 87305-3868

Re: Using Refinery Waste Water for Road Construction

Dear Mr. Acosta:

I have received your letter dated August 12, 1996, requesting authorization to use up to 500,000 gallons of refinery wastewater from ponds #2, #11, and #12 at Giant Refinery for road construction over a two month period.

You may use this water as proposed with the following conditions:

1. The water will be applied so that no excess water runs off into roadside ditches or into any watercourse.

2. At the end of each day's activity, unused water will be stored in trucks or tanks so the water does not drip or drain onto the ground overnight. Alternatively, the water may be returned to the Giant ponds if no other material has been added to the water intentionally, or accidentally mixed with liquids that were previously contained in the truck or tank.

This approval does not relieve you of liability should your operation result in actual pollution of surface waters, ground waters, or the environment that may be actionable under other laws and/or regulations. In addition, this approval does not relieve you of responsibility for compliance with other county, state, federal, or tribal laws and/or regulations.

Sincerely,

Frank T. Chavez
District Supervisor

FTC\sh

cc: Roger Anderson - Santa Fè
Giant Refinery, Ciniza
Denny Foust, District Environmentalist

County of McKinley

P.O. Box 70 - 201 W. Hill Ave.
Gallup, New Mexico 87305 - 0070
505-722-3868
505-863-6362 (FAX)

Commissioner, Dist. 1
Ben Shelly

Chairman
Commissioner, Dist. 2
Earnest C. Becenti, Sr.

Commissioner, Dist. 3
Sharon Richards

Manager
Irvin Harrison

August 12, 1996

Mr. Frank T. Chavez, District III Supervisor
State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

RE: REQUEST TO USE TREATED PROCESS WATER

Dear Mr. Chavez:

McKinley County has several road construction projects slated in the vicinity within a fifteen mile radius of Giant Refining property. Each project will necessitate different amounts of water usage ranging from a minimum of 30,000 gallons per day to a maximum of 50,000 gallons per day, with a total usage of approximately 180,000 gallons minimum to 500,000 gallons maximum, over a two month period per project.

We are requesting permission to utilize the water from Evaporation Ponds #2, #11, or #12 located at Giant Refining properties for road projects near the location. We will notify Giant Refining Co. prior to the beginning of each project and again notify them when the project is completed. The total usage for most road projects would fall in the category given above. It would be most helpful if we could obtain permission for any upcoming projects that would fall in the above category, requesting new permission only if the usage for a project was projected to fall above the maximum stated above.

Thank you for your assistance and cooperation in this matter.

Sincerely,

David J. Acosta
Road Superintendent
DJA/ogb

cc: Mr. Edward L. Horst, Environmental Manager, Giant Ref.
Mr. Patricio W. Sanchez, petroleum Engineer, NMOCD

Assessor
Richard Bowman
201 W. Hill
863-3032
863-6517 Fax

Clerk
Carol K. Sloan
P.O. Box 1268
201 W. Hill
863-6866
863-1419 Fax

Probate Judge
Charley Long, Sr.
P.O. Box 1268
201 W. Hill
863-6866
863-1419 Fax

Sheriff
Frank Gonzales
2105 E. Aztec
863-1410
722-9317 Fax

Treasurer
Charles Long
201 W. Hill
722-4459
722-4450 Fax

MEMORANDUM

TO: Mr. Mark Ashley, Petroleum Geologist **DATE**: July 31, 1997

FROM: Patricio W. Sanchez, Petroleum Engineering Specialist

SUBJECT: Comments on the June 30, 1997 "Comprehensive Facility Investigation Work Plan" for discharge plan GW-032.

Mr. Ashley, the comments that follow are the points contained within this proposed work plan that need further clarification from Giant. (Note: I have not received any feed back from Mr. Foust with our Aztec District Office or Dr. Stuart Dinwiddie of the NMED, HRMB.)

Pg. 1 - Facility History and Operations, paragraph number 3.
The most likely cause.....the Sonsela Aquifer.

Comment: Vadose zone above the Sonsela is already contaminated.

Pg. 2 - Previous Soil and Groundwater Investigations, Bullet points two and three.

Comment: When will these be implemented, no specific dates are given.

Pg. 3 - Previous Soil and Groundwater Sites, Bullet point two.

Comment: What specific areas?

Also Giant states " *In 1989, a hydrocarbon....This site is currently undergoing investigation.*"

Comment: At whose direction - i.e. OCD, EPA, or ED?

Pg. 3 - Refinery Contamination Sites

Bullet point number one and number two - "*Groundwater impact Area #1.....remediation is currently in operation.*"

Comment: What about water draws from the tanks? Was not the old practice of draining water out of tank bottoms thought also to be a cause?

Bullet point number 3 and number 4 - "*Groundwater Impact Area #3.....this area is remediating by natural attenuation.*"

Comment: Who approved of these remedial options and how is its effectiveness being monitored? Also, why were the records regarding the leaking tanks not reported to OCD per WQCC 1203 and OCD Rule 116?

Pg. 4 - Investigation and Abatement Work Plan, both bullet points.
Comment: Why wait until the vadose zone contaminates the Sonsela?

Pg. 4 - Investigation and Abatement Work Plan, Sonsela Aquifer, Paragraph no. 1.
"As the uppermost.....monitoring wells in the Sonsela Aquifer must be properly installed."

Comment: Is the hydraulic conductivity sited a vertical or horizontal value- and how was the number arrived at? Also, based on the recent investigation work has the likelihood of other geological pathways to the Sonsela been eliminated? (i.e. localized fracturing/faulting and depositional environment changes and there effects on grain size and localized porosity and conductivity.)

Also, in the last point (2.) regarding the installation of Sonsela monitor wells - should this wells be double cased in construction?

Pg. 5 - Investigation and Abatement Work Plan, Sonsela Aquifer, Point no. 6

Sampling should be quarterly for BTEX and MTBE on the mentioned wells. (MTBE is also highly mobile.) the analysis should be submitted in an annual report. Also, in general Giant needs to review the entire monitoring and sampling required as a part of GW-032 and submit a revision.

Pg. 5 - Investigation and Abatement Work Plan, Sonsela Aquifer, Point no. 7

How will these wells be plugged? Are any of these wells currently contaminated, and if so how will this be addressed?

Pg. 6 - Contamination Sources, bullet no.1 *" Routine surveillance of.....reported to the Refinery Environmental Department."*

Comment: Per WQCC 1203 and OCD Rule 116 Giant needs to notify OCD .

Pg. 6 - Contamination Sources, last sentence of the last paragraph. *"These sites should continue passive remediation by natural attenuation."*

Comment: How will protection of the Sonsela be monitored in this area?

Pg. 7 Professional Engineers Certification.

Since the plan has been certified by two P.E.'s should OCD accept the plan as is and approve under the OCC - i.e. Mr. Bill Wiess is a Professional Engineer. Also, since it has been certified by these two P.E.'s what legal action can the State take against them if the plan has does not work?

Affidavit of Publication

STATE OF NEW MEXICO
) SS
COUNTY OF MCKINLEY

RANGEL, LYDIA being duly sworn upon oath, deposes and says:

As LEGALS CLERK of The Independent, a newspaper published in and having a general circulation in McKinley County, New Mexico and in the City of Gallup, New Mexico and having a general circulation in Cibola County, New Mexico and in the City of Grants, New Mexico and having a general circulation in Apache County, Arizona and in the City of St. Johns and in the City of Window Rock, Arizona therein: that this affiant makes this affidavit based upon personal knowledge of the facts herein sworn to. That the publication, a copy of which is hereto attached was published in said newspaper during the period and time of publication and said notice was published in the newspaper proper, and not in a supplement thereof, for one time, the first publication being on the 29th day of August, 20 01, the second publication being on the ____ day of ____ 20____, the third publication being on the ____, day of ____, 20____.

and the last publication being on the ____ day of ____, 20____.

That such newspaper, in which such notice or advertisement was published, is now and has been at all times material hereto, duly qualified for such purpose, and to publish legal notices and advertisements within the meaning of Chapter 12, of the statutes of the State of New Mexico, 1941 compilation.

Lydia Rangel
Affiant.

Sworn and subscribed to before me this 30th day of August, A.D., 20 01.

Karen Armstrong
Notary Public

My commission expires:

November 27, 2004

LEGAL NOTICE
Santa Fe County
New Mexico

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

NOTICE IS HEREBY GIVEN that pursuant to New Mexico Water Quality Control Commission Regulations, the following charge plan applications has been submitted to the Director of the Oil Conservation Division, 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

(GW-032) - GIANT REFINING Company, Ms Dirinda Mancini, (505) 722-3833 Route 3, Box 7, Gallup, New Mexico, 87301 has submitted an application for the previously approved discharge plan for their Ciniza Refinery located in Section 28 and Section 33, Township 15 North, Range 15 West, NMPM, McKinley County, near Gallup, New Mexico. The total discharge of process and non-process wastewater from the facility is about 160,000 gallons/day with an estimated total dissolved solids concentration with a range of about 2,000 mg/l to 3,000 mg/l. Groundwater most likely to be affected by a spill, leak, or accidental discharge to the surface varies in depth from 70 feet to 140 feet with an approximate total dissolved solids concentration of 950 mg/l. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday through Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 21st day of August 2001.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

LORI WROTENBERY, Director

Legal #2533 Published in The Independent August 29, 2001.

OK
11/6/01

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

January 24, 1996

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-963-004

Mr. Edward L. Horst
Environmental Manager
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Offsite Waste Approval
Discharge Plan GW-32
NMOCD approved Land farm
Giant Ciniza Refinery

Dear Mr. Horst:

The Santa Fe OCD office has received the letter dated January 11, 1996 titled " REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE ," addressed to Mr. Denny Foust with the OCD Aztec District office. Per the phone conversation with Mr. Patricio Sanchez of my Staff and yourself on The morning of January 23, 1996 - Giant Ciniza has chosen to utilize the form C-138 for wastes that are coming from offsite from Giant Industry owned facilities.

The approval process will proceed as follows for offsite materials to be disposed of at the OCD land farm at the Giant Ciniza Refinery:

1. The Aztec District office will sign the C-138 to allow the movement of the soil to the NMOCD land farm at Giant Ciniza Refinery.

2. The Santa Fe OCD office will sign the C-138 form confirming that the waste may be placed on the NMOCD land farm at Giant Ciniza Refinery.

3. All other wastes generated at the Refinery itself will be certified through the Giant Ciniza Health, Safety, and Environment department with records kept onsite so that the OCD may view them at any time as part of a Discharge plan audit type inspection.

Giant will also evaluate the efficiency of this process from time to time and can request that OCD amend the conditions in (1.) and (2.) above in order to enhance the overall efficiency.

If you have any questions with regards to this matter feel free to contact me at (505)-827-7152 or Patricio Sanchez at (505)-827-7156.

Sincerely,

Roger C. Anderson
Bureau Chief

RCA/pws

xc: Mr. Denny Foust - Gi

Z 765 963 004

Receipt for Certified Mail
No Insurance Coverage Provided

your RETURN ADDRESS completed on the reverse side?

SENDER: Ciniza - LANDFARM. OFFSITE. PWS

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write *"Return Receipt Requested"* on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. Edward L. Horst
Environmental Manager
Giant Ciniza
Route 3, Box 7
Gallup, NM 87301

4a. Article Number
Z 765 963 004

4b. Service Type
☐ Registered ☒ Certified
☐ ~~Express~~ Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
1-29-96

5. Received By: *(Print Name)*
EDWARD L. HORST

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature: *(Addressee or Agent)*
X

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 14, 1995

CERTIFIED MAIL
RETURN RECEIPT NO. Z-765-962-696

Mr. John J. Stokes
Giant Refining - Ciniza Refinery
Route 3, Box 7
Gallup, NM 87301

RE: Approval of Landfarm
Discharge Plan GW-032 Modification
Giant Ciniza Refinery
McKinley County, New Mexico

Dear Mr. Stokes:

The **discharge plan modification GW-032 for the Giant Ciniza Refinery Landfarm** located in Section 28 and Section 33, Township 15 North, Range 15 West, NMPM, McKinley County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. The discharge plan modification consists of the landfarm application and its contents dated April 12, 1995.

The discharge plan modification application was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. Please note Sections 3-109.E and 3-109.F which provide for possible future amendments or modifications of the plan. Please be advised that the approval of this plan does not relieve Giant Refining Co. of liability should the operations associated with this facility result in pollution of surface water, ground water, or the environment. In additon, OCD approval does not relieve Giant of responsibility for compliance with any other Federal, State, or Local laws and/or regulations.

Please be advised that all exposed pits, including lined pits and open top tanks (tanks exceeding 16 feet in diameter), shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

This modification approval to the existing discharge plan will expire August 14, 1996, and you should submit an application for renewal in ample time before this date.

The discharge plan modification for the Giant Refining Co. Ciniza GW-032 is subject to the WQCC Regulation 3-114 discharge plan modification fee. Every billable facility submitting a discharge plan for modification shall be assessed a fee equal to the filing fee of fifty dollars ($50) plus the flat fee of three-thousand, nine-hundred and ten dollars ($3910) for Refineries filing for modification of existing discharge plans.

The filing fee and flat fee for the approved discharge plan modification has not been received by the OCD. The checks should be submitted to the **NMED - Water Quality Management** through the NMOCD office in Santa Fe, New Mexico.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/pws
Attachment

XC : Denny Foust

ATTACHMENT TO OCD PERMIT APPROVAL
Giant Refining Co. Ciniza Refinery
(June 14, 1995)

LANDFARM OPERATION

1. All operating procedures where not specified below will be adhered to as outlined in the application as submitted by Mr. John Stokes with Giant Refining dated April 12, 1995.

2. The facility will be fenced and have a sign at the entrance. The sign will be legible from at least 50 feet and will contain the following information: a) name of the facility, b) the permit number GW-032, c) location by section, township and range, and d) emergency phone number.

3. An adequate berm will be constructed and maintained to prevent runoff and runon for that portion of the facility containing contaminated soils.

4. All contaminated soils received at the facility will be spread and disked within 72 hours of receipt.

5. Soils will be spread in six inch lifts or less.

6. Soils will be disked a minimum of once every two weeks to enhance biodegradation of the contaminants.

7. Successive lifts of contaminated soils will not be spread until a laboratory measurement of Total Petroleum Hydrocarbons (TPH) in the previous lift is less than 100 parts per million (ppm), and the sum of all aromatic hydrocarbons (BTEX) is less than 50 ppm, and the benzene concentration is less than 10 ppm. Comprehensive records of laboratory analysis and the sampling locations will be maintained at the facility. Authorization from the OCD will be obtained prior to the spreading of successive lifts and/or removal of the remediated soils.

8. Only oilfield wastes regulated by the OCD which are exempt from RCRA Subtitle C regulations or non-hazardous by characteristic testing will be accepted at the facility. Solids from operations not currently exempt under RCRA Subtitle C or mixed exempt/non-exempt solids will be tested for the appropriate hazardous Characteristics and submitted to OCD for approval prior to acceptance. Comprehensive records of all laboratory analyses and sample locations will be maintained by the Giant Refining Co.

9. Moisture will be added as necessary to enhance biodegradation and to control blowing dust. There will be no ponding, pooling or runoff allowed. Any ponding of precipitation will be removed within seventy-two (72) hours of discovery.

10. Enhanced bio-remediation through the application of microbes (bugs) and/or fertilizers will only be permitted after prior approval from the OCD. Request for the application of microbes must include the location of the area designated for the bioremediation program, composition of additives, and the method, amount and frequency of application.

11. No free liquids or soils with free liquids will be accepted at the facility.

12. Comprehensive records of all materials received at the facility will be maintained at the facility. The records for each load will include: a) the origin, b) date received, c) quantity, d) exempt or non-exempt status and analyses for hazardous constituents if required, and e) exact cell location and any addition of microbes, moisture, fertilizers, etc.

TREATMENT ZONE MONITORING

1. One (1) background sample will be taken from the center portion of the landfarm two (2) feet below the native ground surface. The sample will be analyzed for total petroleum hydrocarbons (TPH), general chemistry, and heavy metals using EPA approved methods.

2. A treatment zone not to exceed three (3) feet beneath the landfarm will be monitored. A minimum of one random soil sample will be taken from each cell, with no cell being larger than five acres, six (6) months after the first contaminated soils are received in the cell and then quarterly thereafter. The sample will be taken at two (2) to three (3) feet below the native ground surface.

3. The soil samples will be analyzed using approved EPA methods for TPH and BTEX quarterly, and general chemistry and heavy metals annually.

4. After obtaining the soil samples the bore holes will be filled with an impermeable material such as bentonite cement.

REPORTING

1. Analytical results from the treatment zone monitoring will be submitted to the OCD Santa Fe Office within thirty (30) days of receipt from the laboratory.

2. The OCD will notified of any break, spill, or any other circumstance that could constitute a hazard or has potential to result in contamination in accordance with OCD Rule 116 and WQCC section 1-203.

CLOSURE

The Giant will notify the OCD upon cessation of operations. Upon cessation of landfarming operations for six (6) consecutive months, the Giant will complete cleanup of constructed facilities and restoration of the facility site within the following six (6) months, unless an extension is granted by the Director of the OCD. When the facility is to be closed no new material will be accepted. Existing soils will be remediated until they meet the OCD standards in effect at the time of closure. The area will then be reseeded with indigenous grasses and allowed to return to its natural state. Closure will be pursuant to all OCD requirements in affect at the time of closure.

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

January 24, 1996

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-963-004

Mr. Edward L. Horst
Environmental Manager
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Offsite Waste Approval
Discharge Plan GW-32
NMOCD approved Land farm
Giant Ciniza Refinery

Dear Mr. Horst:

The Santa Fe OCD office has received the letter dated January 11, 1996 titled " REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE ," addressed to Mr. Denny Foust with the OCD Aztec District office. Per the phone conversation with Mr. Patricio Sanchez of my Staff and yourself on The morning of January 23, 1996 - Giant Ciniza has chosen to utilize the form C-138 for wastes that are coming from offsite from Giant Industry owned facilities.

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2. The Santa Fe OCD office will sign the C-138 form confirming that the waste may be placed on the NMOCD land farm at Giant Ciniza Refinery.

3. All other wastes generated at the Refinery itself will be certified through the Giant Ciniza Health, Safety, and Environment department with records kept onsite so that the OCD may view them at any time as part of a Discharge plan audit type inspection.

Giant will also evaluate the efficiency of this process from time to time and can request that OCD amend the conditions in (1.) and (2.) above in order to enhance the overall efficiency.

If you have any questions with regards to this matter feel free to contact me at (505)-827-7152 or Patricio Sanchez at (505)-827-7156.

Sincerely,

Roger C. Anderson
Bureau Chief

RCA/pws

xc: Mr. Denny Foust - Gi

Z 765 963 004

Receipt for Certified Mail
No Insurance Coverage Provided

SENDER: Ciniza - LANDFARM OFFSITE. PWS
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write *"Return Receipt Requested"* on the mailpiece below the article number.
- *The Return Receipt will show to whom the article was delivered and the date delivered.*

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. Edward L. Horst
Environmental Manager
Giant Ciniza
Route 3, Box 7
Gallup, NM 87301

4a. Article Number
Z 765-963-004

4b. Service Type
☐ Registered ☒ Certified
☐ ~~Express~~ Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
1-29-96

5. Received By: *(Print Name)*
EDWARD L. HORST

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature: *(Addressee or Agent)*
X

Is your RETURN ADDRESS completed on the reverse side?

Domestic Return Receip

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

July 15, 1996

APZ
Closure Plan Pit

CERTIFIED MAIL
RETURN RECEIPT NO.P-594-835-279

Mr. Edward L. Horst
Environmental Manager
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Discharge Plan GW- 32
OCD Discharge Plan Approval,
Renewal, & Modifications 8/1/86 through 8/15/96
Giant Ciniza Refinery

Dear Mr. Horst:

Pursuant to our phone conversation this morning (7/15/96) I have copied all OCD approval letters regarding GW-032 in terms of permit Approval, Renewal, and Modification. I have also included a copy of the renewal request letter submitted to OCD from Mr. Lynn Shelton with Giant Refining on August 21, 1995. Listed below are the attached letters of approval from the OCD from August 1, 1986 through today July 15, 1996:

1. August 1, 1986 - Groundwater discharge plan for ciniza refinery (GW-32) Approval letter.
2. November 6, 1986- Monitoring Schedule for ciniza refinery,(GW-32).
3. June 10, 1987 -Discharge Plan (GW-32) Modification.
4. February 28, 1990 - Request for modification to groundwater discharge plan (GW-32).
5. July 19, 1990 - Discharge plan (GW-32) modification - ciniza refinery and travel center McKinley County, New Mexico.
6. August 14, 1991 - Discharge Plan GW-32, Renewal.
7. August 21 , 1992 - Discharge Plan GW-32, Modification.
8. September 21, 1993 - Monitor Well OW-1, Modification.
9. March 15, 1995 - Tank Modification Discharge Plan GW-32.
10. June 14, 1995 - Approval of Landfarm Discharge Plan GW-032 Modification.
11. August 21, 1995 - Discharge Plan GW-32 Renewal Request from Giant Refining.
12. January 24, 1996 - Diesel Tank addition Discharge Plan GW-32 - Modification.

Ed, if you have any questions please feel free to give me a call at (505)-827-7156.
Thanks!

Patricio W. Sanchez, Petroleum Engineer

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

January 24, 1996

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-963-007

Mr. David Pavlich
HSE Manager
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Diesel Tank addition
Discharge Plan GW- 32
Giant Ciniza Refinery

PWS
should be BBL / per
RCA 4/Ed. (2-9-96)

Dear Mr. Pavlich:

The New Mexico Oil Conservation Division (OCD) has received Giant's letter dated January 19,1996 , requesting OCD approval for the addition of a 55,000 ~~gallon~~ diesel storage tank. The request is hereby approved as a minor modification to the approved discharge plan GW-32.

The Application for modification was submitted pursuant to Water Quality Control Commission (WQCC) Regulation 3107.C and is approved pursuant to WQCC Regulation 3109. Please note that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan". Pursuant to Section 3107.C you are required to notify the Director of any facility expansion, production increase or process modification that would result in a significant modification in the discharge of potential ground water contaminants.

Note, that OCD approval does not relieve Giant of liability should operations at Ciniza result in contamination of surface waters, ground waters or the environment which is result of this work plan. In addition, OCD approval does not relieve Giant of responsibility for compliance with any other Federal, State, or local laws and/or regulations.

If you have any questions please feel free to call Patricio Sanchez at (505)-827-7156.

Sincerely,

Roger C. Anderson
Bureau Chief

xc: Mr. Denny Foust - Geologist

PS Form **3800**, March 1993

Receipt for Certified Mail
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to David Pavlich.
Street and No. tank Approval - GW-32
P.O., State and ZIP Code

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

Z 765 963 007

GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

August 21, 1995

Roger Anderson
Environmental Bureau Chief
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Discharge Plan GW-32 Renewal Request
Giant Refining Company - Ciniza Refinery
McKinley County, New Mexico

Dear Mr. Anderson:

Pursuant to the requirements of the Water Quality Control Commission (WQCC) regulations, Giant Refining Company is applying for renewal of Groundwater Discharge Plan GW-32. The application is for Giant's Ciniza refinery, which is located in Section 28 and 33, Township 15 North, Range 15 West, NMPM, McKinley County, New Mexico. The original plan was approved August 1, 1986 and was renewed on August 14, 1991. The current plan will expire on August 1, 1996.

The current plan consists of the original plan (August 1, 1986), subsequent permit modifications (December 12, 1986, March 5, 1987, and June 4, 1987 [1st modification]; February 20, 1990 [2nd modification]; and July 10 and 13, 1990 [3rd modification]), the Discharge Plan renewal (August 14, 1991) and its subsequent modifications (August 21, 1992, September 21, 1993, March 15, 1995, and June 14, 1995). There are no other changes in Giant's discharge status and no changes are anticipated within the time frame of this application and the renewal of Discharge Plan GW-32.

This application for the Groundwater Discharge Plan GW-32 is submitted pursuant to Section 3-106 of the New Mexico Water Quality Control regulations.

If you require additional information, please contact me at (505) 722-077.

Sincerely,

Lynn Shelton

Lynn Shelton
Senior Environmental Coordinator
Giant Refining Company

cc: David C. Pavlich
Health, Safety, and Environmental Manager
Giant Refining Company

Kim Bullerdick
Corporate Counsel
Giant Industries Arizona, Inc.

(SRP)[WPDOCS\TLS\NMOCD.821]

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 14, 1995

CERTIFIED MAIL
RETURN RECEIPT NO. Z-765-962-696

Mr. John J. Stokes
Giant Refining - Ciniza Refinery
Route 3, Box 7
Gallup, NM 87301

RE: Approval of Landfarm
Discharge Plan GW-032 Modification
Giant Ciniza Refinery
McKinley County, New Mexico

Dear Mr. Stokes:

The **discharge plan modification GW-032 for the Giant Ciniza Refinery Landfarm** located in Section 28 and Section 33, Township 15 North, Range 15 West, NMPM, McKinley County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. The discharge plan modification consists of the landfarm application and its contents dated April 12, 1995.

The discharge plan modification application was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. Please note Sections 3-109.E and 3-109.F which provide for possible future amendments or modifications of the plan. Please be advised that the approval of this plan does not relieve Giant Refining Co. of liability should the operations associated with this facility result in pollution of surface water, ground water, or the environment. In additon, OCD approval does not relieve Giant of responsibility for compliance with any other Federal, State, or Local laws and/or regulations.

Please be advised that all exposed pits, including lined pits and open top tanks (tanks exceeding 16 feet in diameter), shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

This modification approval to the existing discharge plan will expire August 14, 1996, and you should submit an application for renewal in ample time before this date.

The discharge plan modification for the Giant Refining Co. Ciniza GW-032 is subject to the WQCC Regulation 3-114 discharge plan modification fee. Every billable facility submitting a discharge plan for modification shall be assessed a fee equal to the filing fee of fifty dollars ($50) plus the flat fee of three-thousand, nine-hundred and ten dollars ($3910) for Refineries filing for modification of existing discharge plans.

The filing fee and flat fee for the approved discharge plan modification has not been received by the OCD. The checks should be submitted to the **NMED - Water Quality Management** through the NMOCD office in Santa Fe, New Mexico.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/pws
Attachment

XC : Denny Foust

ATTACHMENT TO OCD PERMIT APPROVAL
Giant Refining Co. Ciniza Refinery
(June 14, 1995)

LANDFARM OPERATION

1. All operating procedures where not specified below will be adhered to as outlined in the application as submitted by Mr. John Stokes with Giant Refining dated April 12, 1995.

2. The facility will be fenced and have a sign at the entrance. The sign will be legible from at least 50 feet and will contain the following information: a) name of the facility, b) the permit number GW-032, c) location by section, township and range, and d) emergency phone number.

3. An adequate berm will be constructed and maintained to prevent runoff and runon for that portion of the facility containing contaminated soils.

4. All contaminated soils received at the facility will be spread and disked within 72 hours of receipt.

5. Soils will be spread in six inch lifts or less.

6. Soils will be disked a minimum of once every two weeks to enhance biodegradation of the contaminants.

7. Successive lifts of contaminated soils will not be spread until a laboratory measurement of Total Petroleum Hydrocarbons (TPH) in the previous lift is less than 100 parts per million (ppm), and the sum of all aromatic hydrocarbons (BTEX) is less than 50 ppm, and the benzene concentration is less than 10 ppm. Comprehensive records of laboratory analysis and the sampling locations will be maintained at the facility. Authorization from the OCD will be obtained prior to the spreading of successive lifts and/or removal of the remediated soils.

8. Only oilfield wastes regulated by the OCD which are exempt from RCRA Subtitle C regulations or non-hazardous by characteristic testing will be accepted at the facility. Solids from operations not currently exempt under RCRA Subtitle C or mixed exempt/non-exempt solids will be tested for the appropriate hazardous Characteristics and submitted to OCD for approval prior to acceptance. Comprehensive records of all laboratory analyses and sample locations will be maintained by the Giant Refining Co.

9. Moisture will be added as necessary to enhance biodegradation and to control blowing dust. There will be no ponding, pooling or runoff allowed. Any ponding of precipitation will be removed within seventy-two (72) hours of discovery.

10. Enhanced bio-remediation through the application of microbes (bugs) and/or fertilizers will only be permitted after prior approval from the OCD. Request for the application of microbes must include the location of the area designated for the bioremediation program, composition of additives, and the method, amount and frequency of application.

11. No free liquids or soils with free liquids will be accepted at the facility.

12. Comprehensive records of all materials received at the facility will be maintained at the facility. The records for each load will include: a) the origin, b) date received, c) quantity, d) exempt or non-exempt status and analyses for hazardous constituents if required, and e) exact cell location and any addition of microbes, moisture, fertilizers, etc.

TREATMENT ZONE MONITORING

1. One (1) background sample will be taken from the center portion of the landfarm two (2) feet below the native ground surface. The sample will be analyzed for total petroleum hydrocarbons (TPH), general chemistry, and heavy metals using EPA approved methods.

2. A treatment zone not to exceed three (3) feet beneath the landfarm will be monitored. A minimum of one random soil sample will be taken from each cell, with no cell being larger than five acres, six (6) months after the first contaminated soils are received in the cell and then quarterly thereafter. The sample will be taken at two (2) to three (3) feet below the native ground surface.

3. The soil samples will be analyzed using approved EPA methods for TPH and BTEX quarterly, and general chemistry and heavy metals annually.

4. After obtaining the soil samples the bore holes will be filled with an impermeable material such as bentonite cement.

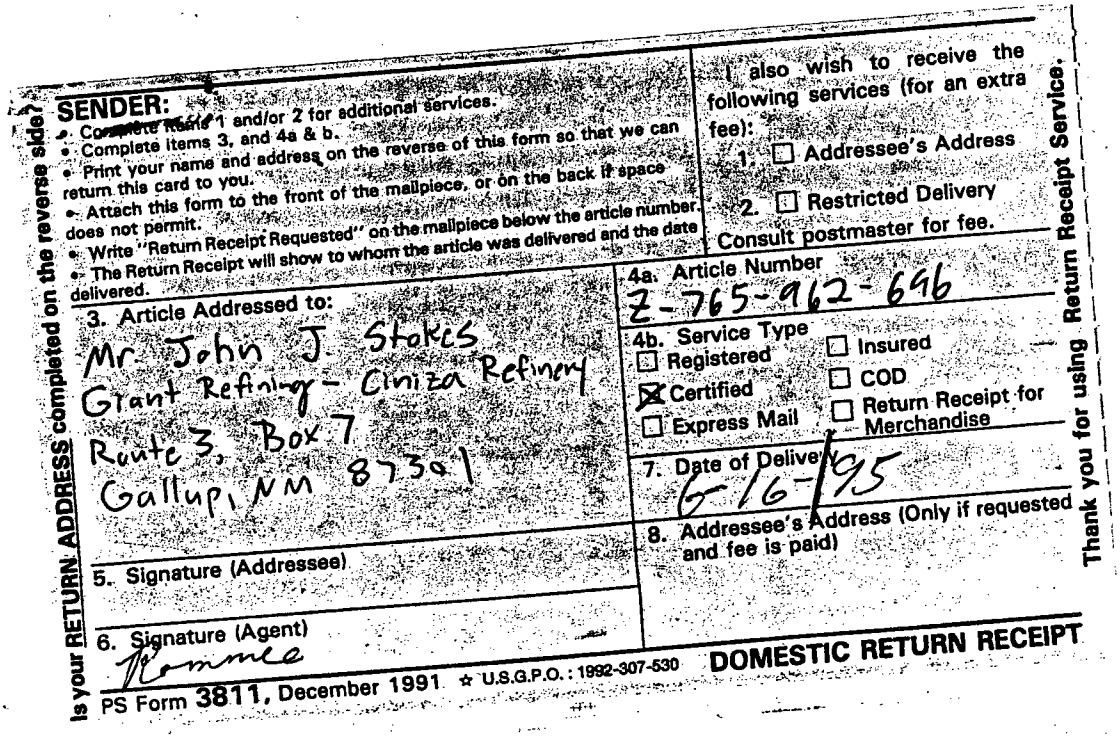
REPORTING

1. Analytical results from the treatment zone monitoring will be submitted to the OCD Santa Fe Office within thirty (30) days of receipt from the laboratory.

2. The OCD will notified of any break, spill, or any other circumstance that could constitute a hazard or has potential to result in contamination in accordance with OCD Rule 116 and WQCC section 1-203.

CLOSURE

The Giant will notify the OCD upon cessation of operations. Upon cessation of landfarming operations for six (6) consecutive months, the Giant will complete cleanup of constructed facilities and restoration of the facility site within the following six (6) months, unless an extension is granted by the Director of the OCD. When the facility is to be closed no new material will be accepted. Existing soils will be remediated until they meet the OCD standards in effect at the time of closure. The area will then be reseeded with indigenous grasses and allowed to return to its natural state. Closure will be pursuant to all OCD requirements in affect at the time of closure.



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1. ☐ Addressee's Address
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Consult postmaster for fee.

3. Article Addressed to:
Mr. John J. Stokes
Grant Refining - Ciniza Refinery
Route 3, Box 7
Gallup, NM 87301

4a. Article Number
Z-765-962-696

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
6-16-95

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
Tommie

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STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

March 15, 1995

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-962-647

Mr. Walter D. Toomer
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Tank Modification
Discharge Plan # GW 32
Giant Ciniza Refinery

Dear Mr. Toomer:

The New Mexico Oil Conservation Division (OCD) has received Giant's letter dated February 16, 1995 requesting the replacement of the API oil/water separator with three 5,000 barrel internal floating roof tanks. Your request is considered a minor modification to the above referenced discharge plan and public notice was not issued.

The requested modification is hereby approved with the condition that Giant submit a "closure plan" for the existing API oil/water separator pit.

The Application for modification was submitted pursuant to Water Quality Control Commission (WQCC) Regulation 3-107.C and is approved pursuant to WQCC Regulation 3-109. Please note that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan". Pursuant to Section 3-107.C you are required to notify the Director of any facility expansion, production increase or process modification that would result in a significant modification in the discharge of potential ground water contaminants.

Note, that OCD approval does not relieve Giant of liability should your operation result in actual contamination of surface waters, ground waters or the environment which is result of this work plan. In addition , OCD approval does not relieve Giant of responsibility for compliance with any other Federal, State, or local laws and/or regulations.

If you have any questions please feel free to call Pat Sanchez at (505)-827-7156.

Sincerely,

William J. LeMay
Director

WJL/pws

XC: Denny Foust

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I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

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3. Article Addressed to:
Mr. Walter D. Toomer
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

4a. Article Number
P 765 962 647

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
3-17-95

5. Signature (Addressee)
Ronnie Brandy

6. Signature (Agent)

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1991 ☆ U.S.G.P.O.: 1992-307-530 DOMESTIC RETURN RECEIPT

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ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

September 21, 1993

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-389

Mr. Lynn Shelton
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: MONITOR WELL OW-1
GIANT CINIZA REFINERY
MCKINLEY COUNTY, NEW MEXICO

Dear Mr. Shelton:

The New Mexico Oil Conservation Division (OCD) has reviewed Giant Refining Company's September 7, 1993 correspondence proposing a modification of the sampling schedule for monitor well OW-1 at the Giant Ciniza Refinery. The proposed modification is a result of recent laboratory analytical results showing low levels of aromatic hydrocarbons in ground water from this monitor well.

The above referenced monitoring proposal **is hereby approved with the following conditions:**

1. Giant will submit the results of the sampling to OCD on a quarterly basis.

2. Giant will submit the proposed assessment of the quarterly sampling to OCD by December 1, 1994.

Please be advised that OCD approval does not relieve Giant of future liability should the contaminants in this well exceed New Mexico Water Quality Control Commission ground water standards or pose a threat to public health or surface waters. In addition, OCD approval does not relieve Giant of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please contact me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: OCD Aztec Office

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

August 21, 1992

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO:P-667-242-143

Mr. Lynn Shelton
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan GW-32
Ciniza Refinery
McKinley County, New Mexico

Dear Mr. Shelton:

The modification of groundwater discharge plan GW-32 for the Giant Refining Company Ciniza Refinery located in the S/4, Section 28, and the N 3/4, Section 33, Township 15 North, Range 15 West, NMPM, McKinley County, New Mexico **is hereby approved.** The discharge plan modification consists of the discharge plan as renewed on August 14, 1991 and the modification application dated July 24, 1992.

The discharge plan modification was submitted pursuant to Section 3-107.C of the Water Quality Control Commission Regulations. It is approved pursuant to section 3-109.A. Please note Section 3-109.F., which provides for possible future amendment of the plan. Please be advised that approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment which may be actionable under other laws and/or regulations.

Please be advised that all exposed pits, including lined pits and open top tanks (tanks exceeding 16 feet in diameter) shall be screened, netted or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan". Pursuant to Section 3-107.c. you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3-109.g.4., the renewed plan approval was for a period of five years. The approval will expire August 14, 1996 and modification of a plan during its term does not alter the expiration date.

The discharge plan modification is a minor modification and public notice is not required. Since the modification does not appreciably alter the discharge quality or quantity, the Director has waived the modification fee.

On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan modification review.

Sincerely,

William J. LeMay
Director

WJL/rca

xc: Denny Foust - OCD Aztec Office

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
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I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr Lynn Shelton
Giant Refining
Rt 3, Box 7
Gallup, NM
87301

4a. Article Number
P 667 242 143

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
8-24-92

5. Signature (Addressee)

6. Signature (Agent)

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, November 1990 ☆U.S. GPO: 1991—287-066 DOMESTIC RETURN RECEIPT

Cuniga

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 14, 1991

CERTIFIED MAIL
RETURN RECEIPT NO. P-756-666-151

Mr. Claud Rosendale
Environmental Manager
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan GW-32
Ciniza Refinery
McKinley County, New Mexico

Dear Mr. Rosendale:

The groundwater discharge plan renewal (GW-32) for the Giant Refining Company Ciniza Refinery located in the S/4 of Section 28, the N 3/4 of Section 33, Township 15 North, Range 15 West, NMPM, McKinley County, New Mexico is hereby approved. The discharge plan consists of the original plan as approved August 1, 1986, the renewal application dated July 24, 1990 and materials dated August 9, 1991 submitted as a supplement to the application.

The discharge plan was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. It is renewed pursuant to Section 3-109.A. Please note Section 3-109.F., which provides for the possible future amendments of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment which may be actionable under other laws and/or regulations.

Please be advised that all exposed pits, including lined pits and open top tanks (tanks exceeding 16 feet in diameter), shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C. you are required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire August 1, 1996 and you should submit an application for renewal in ample time before that date. It should be noted that all gas processing plants and oil refineries in excess of twenty-five years of age will be required to submit plans for, or the results of an underground drainage testing program as a requirement for discharge plan renewal.

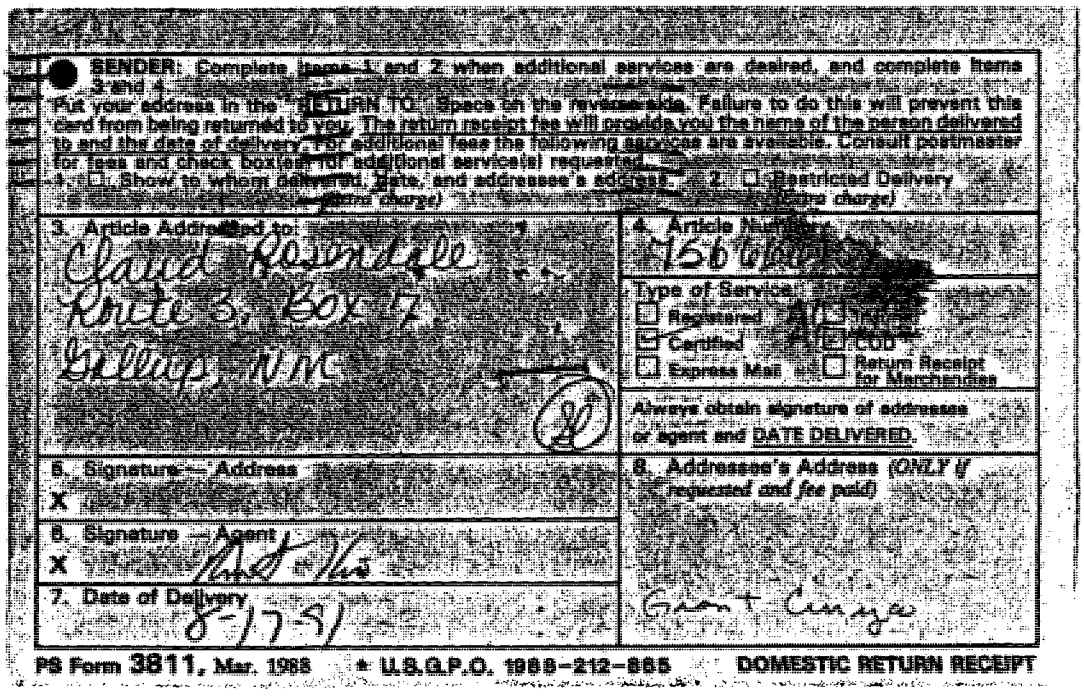
On behalf of the staff of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

William J. LeMay
Director

WJL/RCA/sl

cc: OCD Aztec Office



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

July 19, 1990

Mr. Claud Rosendale
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan (GW-32) Modification - Ciniza Refinery and Travel Center
McKinley County, New Mexico

Dear Mr. Rosendale:

The Oil Conservation Division (OCD) has received your discharge plan modification requests dated July 10, 1990 and July 13, 1990. The proposed modification dated July 10, 1990 is for the installation of a drain sump at the Travel Center and the proposed modification dated July 13, 1990 is for installation of a spray evaporation system at pond #2 at the refinery. The modifications will not alter the volumes of effluent discharged and are hereby approved with the following conditions:

1. Individual sprinklers in the spray system will be oriented to direct the fluid spray so that no direct spray or windblown draft will leave the confines of Pond #2.

2. The spray system will not be operated when wind conditions will allow spray or salt precipitates to drift outside the confines of Pond #2.

The modifications do not appreciably alter the volumes or characteristics of your discharges, therefore public notice was not issued.

Please be aware that approval of these modifications does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment actionable under other laws and/or regulations.

If you have any questions, please do not hesitate to contact Roger Anderson at (505) 827-5884.

Sincerely,

William J. LeMay
Director

WJL/RCA/sl

cc: OCD Aztec Office

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

February 28, 1990

Mr. Claud Rosendale
Environmental Manager
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Request For Modification To Groundwater Discharge Plan (GW-32)

Dear Mr. Rosendale:

The New Mexico Oil Conservation Division (OCD) has reviewed Giant Industries Inc. February 20, 1990 request to modify the August 1, 1986 Groundwater Discharge Plan (GW-32), Ciniza Refinery - Monitoring and Reporting Schedule. OCD approves of Giant Industries Inc. request to conduct monitor well sampling events in the spring and fall at the time of RCRA samplings.

No modified schedule was included for submitting reports containing the monitor well sampling analytical results. Therefore, OCD expects to receive analytical reports within 30 days of analysis receipt verification as required in the August 1, 1989 Groundwater Discharge Plan (GW-32), Ciniza Refinery - Monitoring and Reporting Schedule. In addition, OCD requests that Giant Industries give OCD at least 2 weeks notice prior to monitor well sampling events so that OCD may be given the opportunity to split samples.

If you have any questions, please contact Bill Olson, of my staff, at 827-5885.

Sincerely,

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/WCO/si

cc: F. Chavez, Aztec District Office

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

June 10, 1987

Mr. R.L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, NM 87301

RE: Discharge Plan (GW-32) Modification

The modification to previously approved groundwater discharge plan (GW-32) for the Giant Ciniza Refinery located in Sections 28 and 33 of Township 15 North, Range 15 West, NMPM, McKinley County, New Mexico, is hereby approved. The modification consists of the application dated December 12, 1986, and materials dated March 5, 1987 and June 4, 1987, submitted as supplements. The discharge plan (GW-32) was approved August 1, 1986.

The application for modification was submitted pursuant to WQCC Regulation 3-107.C and is approved pursuant to WQCC Regulation 3-109. Please be advised that the approval of this modification does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

There will be no routine monitoring or reporting requirements other than those mentioned in the plan and modification.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to

Section 3-107.C. you are required to notify the Director of any facility expansion, production increase or process modification that would result in any significant modification in the discharge of water contaminants.

Sincerely,

William J. LeMay
Director

WJL/RA/ag

xc: OCD-Aztec

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

November 6, 1986

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501-2088
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: MONITORING SCHEDULE FOR CINIZA REFINERY, GW-32

Dear Mr. McClenahan:

In response to your requests in Giant's letter of October 13, 1986, the following minor changes to the Discharge Plan Monitoring and Reporting Schedule are approved.

1. Flow measurement of API wastewater at the entrance to Pond #1 and outlet from Pond #2. Flow of the neutralization stream will also be measured.

2. MW-Series monitor wells sampled April and October (instead of January and July) for required RCRA constituents.

3. MW-Series monitor wells sampled October, 1986; April, 1987; thence anually beginning October, 1987 for required discharge plan contaminants.

4. Annual January sampling of SMW and required OW wells for required discharge plan contaminants.

A revised Monitoring and Reporting Schedule based on your letter is enclosed. If you have any questions on the revised schedule, please let me know. I can be reached by telephone at 827-5812.

Sincerely,

DAVID G. BOYER
Hydrogeologist/Environmental Bureau Chief

DGB:dp

Enc.

cc: Alberto Gutierrez, Geoscience Consultants, Ltd.
Carlos Guerra, Giant Industries
Frank Chavez, OCD-Aztec

CINIZA REFINERY

Monitoring and Reporting Schedule

: schedule below summarizes the routine monitoring and reporting agreed to be performed by Giant as part of the discharge
ın for the Ciniza Refinery (GW-32). While this summary is meant to be inclusive, if any differences occur between the
ıedule presented here and presented in the discharge plan, the discharge plan (including subsequent correspondence) is the
ıtrolling document.

Monitoring	Sampling Parameters	Reporting Frequency	Discharge Plan Reference
[separator effluent quarterly the entrance to Pond #1 and :let from Pond #2 for four con-ıutive quarters, thence bi-ıually coincidentally with high-ow periods. Neutralization :eam measured on same schedule.	Flow rate of discharge	Quarterly reports during first year on same schedule as RCRA results to NMEID; annual there-after with submittal to OCD within 30 days of receipt and verification.	Giant's response to OCD com-ments, p. 11, dated 2/3/86; p. 2, Giant's letter dated 4/30/86; p. 4, Giant's lette: dated 6/26/86; Giant's lette: dated 10/13/86.
:ated lagoon input for four ırters, thence annually.	BOD	Same as above	p. 2, Giant's letter dated 4/30/86; and p. 4, Giant's letter dated 6/26/86
ıporation ponds inspected ıthly for freeboard, fluid vels, and seepage. Inspec-on also after 10-year preci-tation event (1.8"/24 hrs.) ·easured at refinery.	None	None. Refinery records kept on monthly inspec-tions, and on precipi-tation events exceeding 1.8" per 24 hrs.	p. 3, Giant's letter dated 4/30/86; and p. 4, Giant's letter dated 6/26/86
-Series monitor wells sampled ril and October, as per RCRA. W-Series sampled for four nsecutive quarters, thence nuary and July, as per RCRA.	RCRA constituents as approved by EID (in-cluding conductivity, TOC, TOX, and pH)	Copies of RCRA MW and SMW results sent to OCD on same as to NMEID.	Giant's response to OCD comments, p. 11, dated 2/3/86; p. 3, Giant's letter dated 4/3/86; Giant's letter dated 10/13/86.
-Series monitor wells sampled tober, 1986, and April, 1987, ence annually beginning October, 87, at time of RCRA sampling.	sodium, potassium, calcium, magnesium, chloride, sulfate, carbonate-bicarbonate, TDS, pH, and conductance	Submit 1986 results with January 1987 results by March 1, 1987. Thereafter annual results submitted within 30 days of analysis receipt verification.	Giant's response to OCD comments, p. 11, dated 2/3/86; p. 3, Giant's letter dated 4/3/86; p. 4, Giant's letter dated 6/26/86; Giant's letter dated 10/13/86.
W-Series monitor wells sampled ril and July 1986, January, 87, thence annually in January time of RCRA sampling.	sodium, potassium, calcium, magnesium, chloride, sulfate, carbonate-bicarbonate, TDS, pH, conductance, and volatile aromatic hydrocarbons (BTX)	Same as immediately above	Same as immediately above
nitor Wells CW1, CW2 and 3, sampled annually in nuary.	Same as immediately above	Submitted within 30 days of analysis receipt and verification	p. 3, Giant's letter dated 4/3/86; p. 4, Giant's letter dated 6/26/86; Giant's letter dated 10/13/86

Revised 11/4/86
OCD/DGB

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501-2088
(505) 827-5800

August 1, 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Carl Shook, Vice President
Refining Operations
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: GROUNDWATER DISCHARGE PLAN FOR CINIZA REFINERY (GW-32)

Dear Mr. Shook:

The groundwater discharge plan (GW-32) for Giant Ciniza Refinery located in Sections 28 and 33 of Township 15 North, Range 15 West, (NMPM) McKinley County, New Mexico, is hereby approved. The approved discharge plan consists of the plan dated November 25, 1985, and the materials dated February 3, 1986; April 30, 1986; June 26, 1986; and July 30, 1986, submitted as supplements to the discharge plan.

The discharge plan was submitted pursuant to Section 3-106 of the N.M. Water Quality Control Commission Regulations. It is approved pursuant to Section 3-109. Please note subsections 3-109.E. and 3-109.F., which provide for possible future amendment of the plan. Please be advised that the approval of this Plan does not relieve you of liability should your operation result in actual pollution of surface or groundwaters which may be actionable under other laws and/or regulations.

The monitoring and reporting shall be specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet. Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C. you are required to notify the director of any facility expansion, production increase, or process modification that would result in any significant modification in the discharge of water contaminants.

Please be aware that in this discharge plan you have made commitments which are legally enforceable under the New Mexico Water Quality Act. These include constructing all aspects of your installation as designed, and

completely fulfilling all monitoring commitments on schedule. You are susceptible to fines should you not fulfill these obligations.

Pursuant to subsection 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire August 1, 1991, and you should submit an application for new approval in ample time before that date.

On behalf of the staff of the Oil Conservation Division, I wish to thank you, your staff, and consultants for cooperation during this discharge plan review.

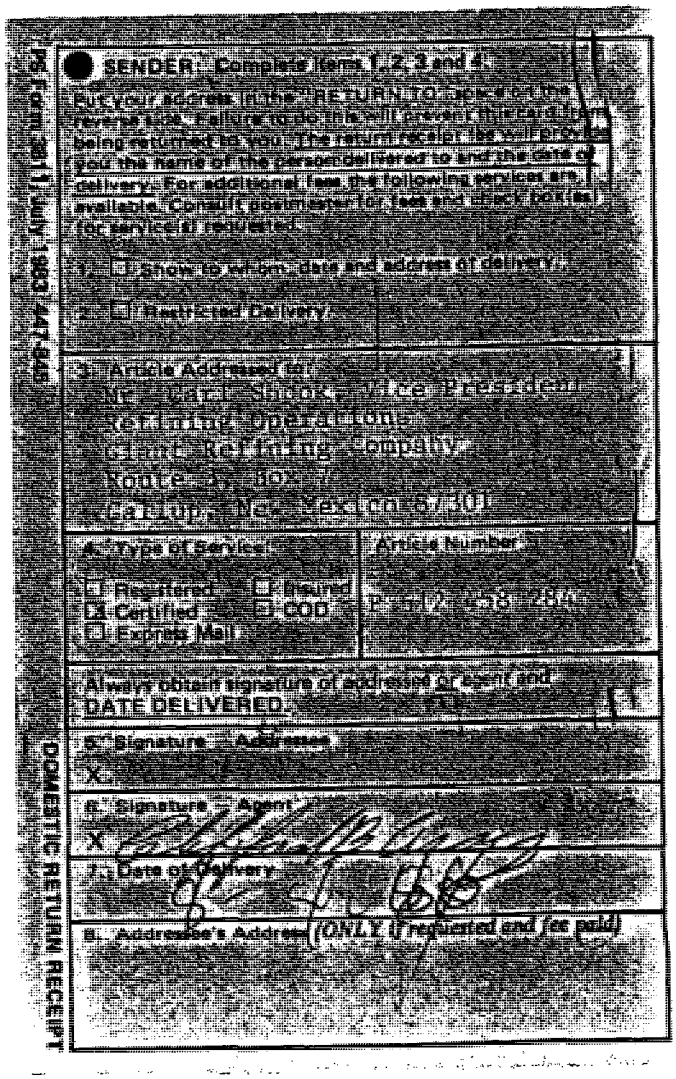
Sincerely,

R. L. STAMETS
Director

RLS:DGB:dp

Attachment

cc: Carlos Guerra, Giant Industries
Alberto Gutierrez, Geoscience Consultants
W. Perry Pearce, Montgomery and Andrews
Peter Pache, NMEID



Dames & Moore

6400 Uptown Boulevard N.E., Suite 398-W, City Centre
Albuquerque, New Mexico 87110
(505) 883-5885

March 11, 1981

Shell Oil Company
Box 7, Route 3
Gallup, New Mexico 87301

Attention: Mr. Mitchell Sapp

Gentlemen:

This letter transmits three (3) copies of our final report, "Ground Water and Soils Investigation, Ciniza Refinery, Near Gallup, New Mexico, For Shell Oil Company". This work was performed under Purchase Order No. CR-2149.

The report provides a significant part of the information required to develop a closure plan and post-closure plan for a hazardous waste land treatment facility as prescribed under RCRA.

We have appreciated the opportunity to perform these services for Shell Oil Company. Please contact us if there are any questions.

Yours very truly,

DAMES & MOORE

William E. Mead

William E. Mead
Partner

WEM:lj

Attachment

GROUND WATER AND SOILS INVESTIGATION

CINIZA REFINERY

NEAR GALLUP, NEW MEXICO

FOR SHELL OIL COMPANY

1.0 INTRODUCTION

This report presents the results of our investigations at the Ciniza Refinery of Shell Oil Company near Gallup, New Mexico, relative to ground-water conditions in the general vicinity of the plant and soil conditions in the area to be used for treating solid waste. Field work was commenced on October 27, 1980 and completed on January 6, 1981.

2.0 PURPOSE AND SCOPE OF WORK

The purpose of the work described herein was to provide data necessary for compliance with the Interim Status permitting requirements of the Resources Conservation and Recovery Act of 1976 (RCRA), and included the following objectives:

1. To characterize the geohydrologic regime in the plant area and its immediate vicinity.
2. To evaluate the extent of ground-water contamination, if any, at the site and the degree to which it may be attributable to plant operation.

3. To assess the background physical and chemical characteristics of the soils and/or rock material in the area used for land treatment of solid waste.
4. To assist Shell Oil Company in achieving compliance with the RCRA Interim Status Standards.

The scope of work undertaken to fulfill the above objectives comprised essentially Phases I and II of the four-phase program described in our original proposal dated October 2, 1980, and included:

1. The drilling of 17 observation wells.
2. The collection of ground-water samples and measurement of the water table.
3. The excavation of five test pits in the land treatment area.
4. The collection of bulk and in-situ soil samples from the test pits.
5. The laboratory analysis of ground-water and soil samples for selected physical and chemical parameters.
6. Assistance to Shell Oil Company in preparing a description of the land treatment area and a preliminary plan for monitoring and sampling this area during waste disposal activities.
7. Preparation of a report describing the results of these investigations.

3.0 SITE DESCRIPTION

The Ciniza Refinery is located in Sections 28 and 33 of T.15N., R.15W, and in Section 4 of T.14N., R.15W., N.M.P.M. Drainage is north and west toward the South Fork of the Puerco River, a westward-flowing

4.1.2 Ground-Water Investigation

Seventeen observation wells were drilled by percussion methods to investigate the near-surface geology and ground-water hydrology at the site. Permits to drill these wells were issued by the New Mexico State Engineer. Original plans envisioned as many as 20 to 25 wells being drilled. However, fewer wells were found to be necessary to adequately describe the hydrogeologic conditions. The wells ranged in depth from 45 to 163 feet and were drilled either at 8 or 10 inches in diameter. A total of 1,505 feet of drilling was completed. Four-inch diameter PVC casing was installed in each well and included a perforated section at the desired depth interval. Approximately two feet of PVC casing were allowed to extend above ground level and the bottom end of the casing was plugged. The annular space between the PVC casing and the wall of the boring was packed with gravel opposite the perforations and for a distance of several feet above the top of the perforations to allow for settlement. A Quick-Gel bentonite seal was emplaced above the gravel pack for an interval that varied from 5 to 15 feet among the several wells. The bentonite was followed either by sand concrete or by cement grout which extended to the ground surface. Grout emplacement was achieved by using a tremie pipe. Most of the wells which penetrated the sandstone artesian aquifer were inspected by a representative of the State Engineer's office during the grout emplacment.

A protective steel casing 8-5/8 inches in diameter fitted with a locking cap was installed over the above-ground extension of the PVC casing in each well and was cemented in place.

DP ATTACHMENT B-1
3-81
SUBMITTED 2-3-86.
INSTALLED BY SHELL.

TABLE 2
SUMMARY OF WELL DATA

NAME	COORDINATES [1] NORTH	WEST	GROUND [1] ELEVATION	TOTAL DEPTH (ft)	DATE COMPLETED	AQUIFER [3][4] INTERVAL (ft)	DEPTH OF [2] WATER TABLE (ft)	ELEVATION WATER TABLE (ft)
OW-1	3190	5150	6868	99.5	11/10/80	86-98	6.4	6861.6
OW-2	5985	5125	6871	163	10/31/80	143-162.5	31.2	6839.8
OW-3	5855	4220	6876	67	11/04/80	-	34.4	6841.6
OW-4	4960	3565	6881	102	11/07/80	100-102	29.2	6851.8
OW-5	4325	2970	6882	92	11/12/80	82-92	16.2	6865.8
OW-7	3875	3740	6872	70	11/18/80	-	6.7	6865.3
OW-9	2215	3445	6873	60	11/21/80	23-46	0.6	6872.4
OW-10	2710	3470	6872	68	11/25/80	34-63	1.7	6870.3
OW-11	1365	1455	6923	150	12/30/80	30-40	20.2	6902.8
OW-12	4490	1540	6939	145	12/15/80	104-143	47.3	6891.7
OW-13	4790	970	6914	108	12/10/80	70-104	23.2	6890.8
OW-14	4245	495	6923	45	12/17/80	39-45	25.8	6897.2
OW-16	3800	1365	6942	55	12/02/80	47-50	26.8	6915.2
OW-17	3885	1195	6941	50	1/03/81	40-42	31.8	6909.2
OW-18	3955	1020	6932	82	12/04/80	61-82	-	?
OW-20	2965	410	6961	83	12/19/80	70-82	50.2	6910.8
OW-24	5475	3875	6878	65	1/02/81	-	32.5	6845.5
				1,505				

[1] Estimated - survey required

[2] Last measurement Jan.5, 1981

[3] Depth underlined is maximum depth of well

[4] Does not include zones of sandy shale

CINIZA REFINERY

Monitoring and Reporting Schedule

The schedule below summarizes the routine monitoring and reporting agreed to be performed by Giant as part of the discharge plan for the Ciniza Refinery (GW-32). While this summary is meant to be inclusive, if any differences occur between the schedule presented here and presented in the discharge plan, the discharge plan (including subsequent correspondence) is the controlling document.

Monitoring	Sampling Parameters	Reporting Frequency	Discharge Plan Reference
API separator effluent quarterly at the two Weir locations for four consecutive quarters, thence bi-annually coincidentally with high-flow periods. Neutralization stream measured on same schedule.	Flow rate of discharge	Quarterly reports during first year on same schedule as RCRA results to NMEID; annual thereafter with submittal to OCD within 30 days of receipt and verification.	Giant's response to OCD comments, p. 11, dated 2/3/8 p. 2, Giant's letter date 4/30/86; p. 4, Giant's le dated 6/26/86
Aerated lagoon inpu[illegible] for four quarters, thence annually.	BOD	Same as above	p. 2, Giant's letter date 4/30/86; and p. 4, Giant' letter dated 6/26/86
Evaporation ponds inspected monthly for freeboard, fluid levels, and seepage. Inspection also after 10-year precipitation event (1.8"/24 hrs.) as measured at refinery.	None	None. Refinery records kept on monthly inspections, and on precipitation events exceeding 1.8" per 24 hrs.	p. 3, Giant's letter date 4/30/86; and p. 4, Giant' letter dated 6/26/86
MW-Series monitor wells sampled January and July, as per RCRA. SMW-Series sampled for four consecutive quarters, thence January and July, as per RCRA.	All approved RCRA (including contuctivity , TOC, TOX, and pH)	Copies of RCRA MW and SMW results sent to OCD on same as to NMEID.	Giant's response to OCD comments, p. 11, dated 2/3/86; p. 3, Giant's letter dated 4/3/86
MW-Series monitor wells July, 1986 and January 1987, thence annually at time of RCRA sampling.	sodium, potassium, calcium, magnesium, chloride, sulfate, carbonate-bicarbonate, TDS, pH, and conductance	Submit 1986 results with January 1987 results by March 1, 1987. Thereafter annual results submitted within 30 days of analysis receipt verification.	Giant's response to OCD comments, p. 11, dated 2/3/86; p. 3, Giant's letter dated 4/3/86; p. 4, Giant's letter dated 6/26/86
SMW-Series monitor wells April and July, 1986, January, 1987, thence annually at time of RCRA sampling	sodium, potassium, calcium, magnesium, chloride, sulfate, carbonate-bicarbonate, TDS, pH, conductance, and volatile aromatic hydrocarbons (BTX)	Same as immediately above	Same as immediately above
Monitor Wells OW1, OW2 and OW3, sampled annually	Same as immediately above	Submitted within 30 days of analysis receipt and verification	p. 3, Giant's letter dated 4/3/86; p. 4 Giant's letter dated 6/26/86

GIANT REFINING CO.

OIL CONSERVATION DIVISION
RECEIVED
'92 APR 10 AM 8 49

April 8, 1992

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

Edward Horst
Program Manager
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

Re: Annual Groundwater Sampling Event

Dear Mr. Horst:

Pursuant to Attachment G, Part 2.B.ii., of the Part B Permit, Giant Refining Company intends to conduct its Annual Groundwater Sampling event on April 13 to April 15, 1992 at its Ciniza Refinery. The schedule for purging and sampling is:

April 13, 1992	8:00 - 12:00	API Effluent,* Aerated Lagoon Effluent*
	12:30 - 4:30	Purge OW-1*, OW-2*, OW-3*' OW-11, MW-1, MW-2, MW-4, MW-5
April 14, 1992	8:00 - 12:00	Sample OW-1, OW-2, OW-3, OW-11, MW-1, MW-2, MW-4, MW-5
April 14, 1992	12:30 - 4:30	Purge SMW-1, SMW-2, SMW-3, SMW-4, SMW-5, SMW-6
April 15, 1992	8:00 - 12:00	Sample SMW-1, SMW-2, SMW-3 SMW-4, SMW-5, SMW-6

*For OCD

Parameters for each sampling point are included in the attached lists.

If you require any additional information, please contact me at (505) 722-0227.

Sincerely,

Lynn Shelton

Lynn Shelton
Environmental Assistant
Giant Refining Company - Ciniza

TLS:sp

ANNUAL GROUNDWATER SAMPLING EVENT (MARCH OR APRIL)
PARAMETERS

WELL	pH	COND	TOC(2)	TOX(2)	TDS	ALKAL BICARB	ALKAL CARB	CHLORIDE	SULFATE	PHENOL	VOL-ORG 8240	BTEX 8020	TOTAL METALS Cr	Pb	Hg	As	Ba	Cd	DISSOLVED METALS Ca	Mg	Mn	K	Se	Ag	Na
MW-1	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X
SMW-1	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	X
SMW-2	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	X
SMW-3	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	X
SMW-4	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	X
SMW-5	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	X
SI	X	X	X	X	X	X	X	X	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	X
OW-1	X	X	-	-	X	X	X	X	X	-	-	X	-	-	-	-	-	-	X	X	-	X	-	-	X
OW-2	X	X	-	-	X	X	X	X	X	-	-	X	-	-	-	-	-	-	X	X	-	X	-	-	X
OW-3	X	X	-	-	X	X	X	X	X	-	-	X	-	-	-	-	-	-	X	X	-	X	-	-	X

2 - REPLICATES