

FILE



Interoffice Communication

To G. G. Draper

From Al Peck

Date December 10, 1974

Subject Phase I Revisions to the Loading Area Bauxite Bed for Reduction of VCM Exposure Design No. 17-400-1174-ARP

A major source of VCM release at our plant occurs during the clearing and recharging of the loading area bauxite bed. The principle sources and causes of the VCM emissions are:

1. VCM release during the installation of the blinds on the vessel. VCM remains in the vessel due to inadequate clearing procedures and inadequate piping to permit total clearing.
2. VCM release caused by VCM deadsorbing from the bauxite during the period when water is being added to the vessel.
3. VCM release during initial opening of the vessel. This is caused by the residual deadsorbed VCM remaining in the vessel after purging and by additional VCM which is gradually being released by the bauxite.
4. VCM release during the period when the bauxite is being removed from the vessel. This again is caused by the gradual deadsorption of the VCM from the bauxite.

The purpose of this design is to describe those changes which can be implemented immediately. The changes include modifications to the bauxite bed valving and piping which are necessary to reduce personnel exposure. Attached is the description of these changes, a process flow drawing showing the location of the recommended revisions, and a procedure guideline for clearing and recharging the vessel.

To completely clear the vessel prior to maintenance it will be necessary to find a method of deadsorbing VCM off of the bauxite prior to opening the vessel and removing the spent bauxite. Several methods have been tried on a small scale using laboratory apparatus. None of these methods have, as yet, totally succeeded in driving all of the VCM from the bauxite. This laboratory testing is continuing and recent results indicate a suitable method will be developed soon. A supplementary Phase II design will soon be issued describing the total optimum clearing procedures for the dryer-bauxite loading beds. The Phase II design will incorporate the most satisfactory known method of dead-

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sorbing the VCM from the bauxite as well as the best system of vacating the vessels of vapors and preventing personnel exposure. As the Phase II design includes equipment which may have extended delivery times its implementation will not be possible immediately. Please review this information and return all comments and suggestions to Douglas Michels by December 23, 1974.

al Peck/bem

Al Peck

Approved

Douglas Michels

bc

CC:

JAD-JHM-CEG-GGD(5)-JRH(4)-JCL-JSR

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DESIGN DESCRIPTION

PHASE I BAUXITE BED REVISIONS

Figure I shows a process flow drawing of the loading area bauxite bed. The present piping as well as the recommended revisions are indicated.

The existing nitrogen purge connections permit the nitrogen to be injected into the bottom of the vessel and into the side of the vessel. The exit purge is directed out the top of the vessel to the Corken compressor, through the recovery system and then to the vent stack.

This purging scheme has the following disadvantages.

- 1) VCM vapor, being heavier than nitrogen, is not completely purged out of the bottom head of the vessel.
- 2) Nitrogen purging through the side of the vessel can shortcut the system and the result is ineffective purging.
- 3) Purge time is extended as a result of the back pressure provided by the vent recovery system.

The revisions included in this design will correct these problems.

- 1) The purge will enter through the top of the vessel and exit from the bottom of the vessel. This will drive the heavier VCM vapor out the bottom of the vessel.
- 2) The nitrogen inlet will be relocated to the top of the bauxite bed. This will permit more effective purging and lessen the shortcutting possibility.
- 3) After the initial clearing of the liquid from the vessel, the Corken will be used to evacuate the vessel directly to the vent rather than using the recovery system. Calculations indicate little VCM is recovered after the initial draining step. Thus evacuating to the vent will reduce clearing time without reducing VCM recovery.
- 4) The Corken compressor will be allowed to continue to operate during vessel blinding and unblinding and during the initial opening of the bauxite bed. This will reduce the VCM exposure during these operations by not permitting the VCM vapors to exit at points where maintenance personnel are working.

Additional piping revisions are included to permit separate purging of the bauxite and dryer beds. The piping system now permits liquid clearing of the bauxite bed only if the dryer bed is also cleared of liquid. This will also be true in the future. Piping changes are in this design to permit independent pressure purging and evacuation of the vessels. Independent pressure purging and evacuation should speed up the dryer and bauxite bed recharging operation.

Two additional changes are included in this design. A liquid level gauge is added to the bauxite bed using an existing 6 inch connection on the side of the vessel. This level gauge will permit the operator to ascertain when the vessel is empty of liquid. This is possible now only through watching the frost line on the vessel or listening to the sound of the nitrogen purging through the vessel.

An additional line is added from the drain line from the dryer to the drain line off from the bauxite bed. This piping change is required to facilitate dryer clearing.

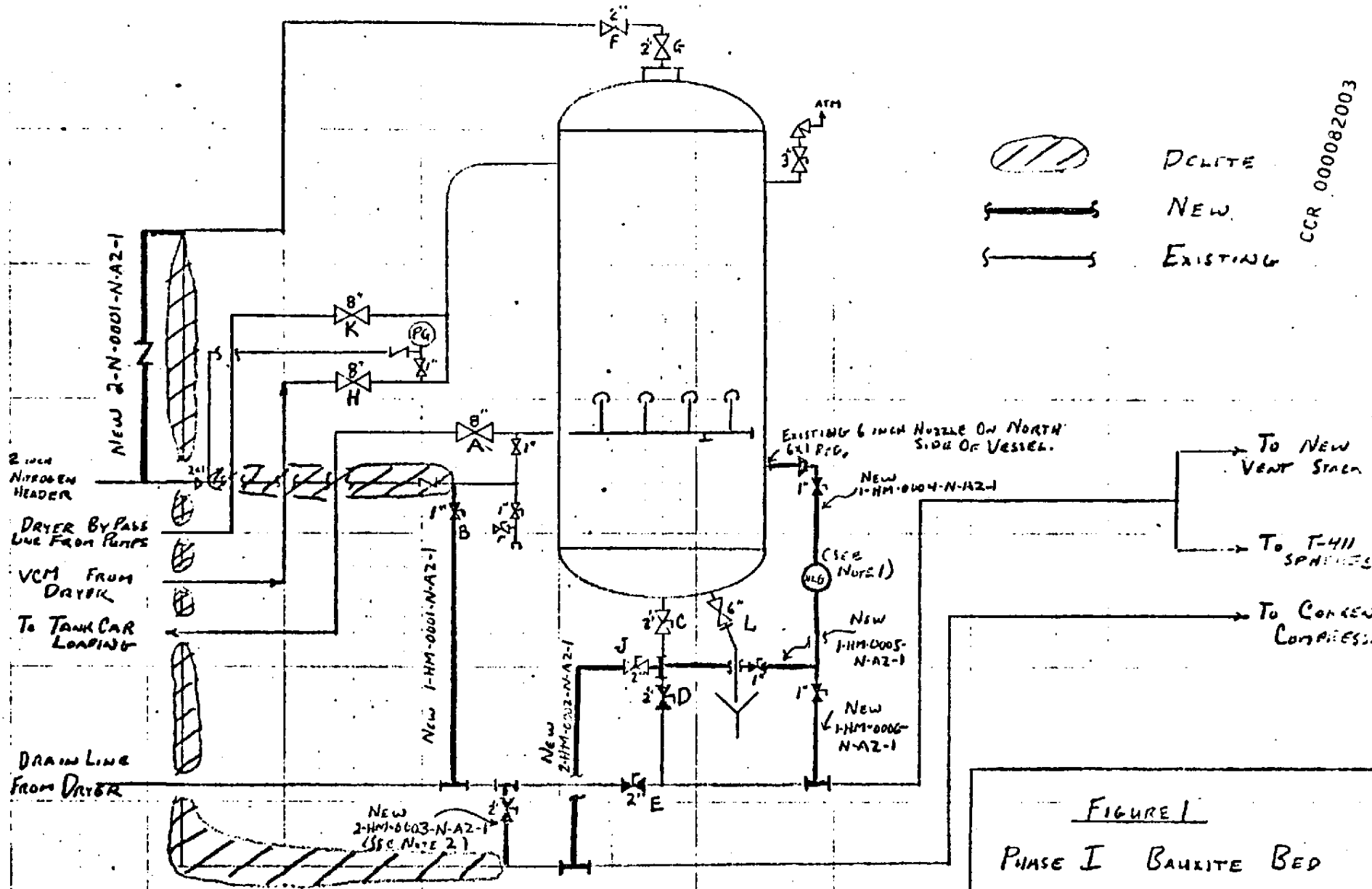
CLEARING PROCEDURE - LOADING AREA BAUXITE BED

PHASE I BAUXITE BED REVISIONS

Note: Valves are designated with a letter. Refer to Figure 1 for Location of valves.

1. Close valve A on outlet line to tank car loading.
2. Line up drain line to a T-411 sphere. The sphere in vinyl service having the lowest head pressure should be used. Open valves B, C, D and E.
3. Open valves F and G on the Nitrogen Inlet to the Bauxite Bed. The liquid will now be pressured out to a T-411 sphere. Note that the liquid in the feed line from the dryer will be back pressured back into the dryer through open Valve H during this step.
4. Observe the liquid level glass. When the liquid level disappears, Bauxite Bed is empty of liquid. Close Valves H and B.
5. Line up the drain line to the new vent stack.
6. Pressure purge the vessel three times to the vent stack. This can be done by closing valve D to pressure vessel and then opening D to depressure the vessel.
7. Purge the vessel to the vent stack using nitrogen for several hours as is the present practice.
8. Close valves D, F, and G.
9. Open Valve J. Line up outlet of Corken compressor to the vent. Then turn on Corken compressor.
10. With the Corken running, break flanges and install blinds at A, H, and K. Remove blind from L.
11. Close valves C and J and turn off the Corken Compressor.
12. Deadsorb VCM from the Bauxite via a procedure to be described in a design to be issued in the future.
13. Remove Bauxite and recharge bed.
14. Unblind valves at A, H and K. Install blind at Point L.
15. Open valves C, D, F, and G and purge with nitrogen to the vent until the oxygen concentration within the vessel drops below 100 ppm. Close C, D, F and G.
16. Bauxite Bed can now be restored to service by opening valves A and H.

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- NOTE 1- LOCATE LEVEL GAUGE SO LEVEL CAN BE READ AT LOW POINT OF TANK.
- NOTE 2- THIS CHANGE IS REQUIRED TO PERMIT INDEPENDENT CLEARING OF BAUXITE AND DRYER BEDS.
- NOTE 3- ALL NEW VALVES ARE TO BE JAMESBURY BALL VALVES.

FIGURE 1
PHASE I BAUXITE BED
REVISIONS
ARP 11-23-74

LEVEL GAUGE SPECIFICATION

PHASE I BAUXITE BED REVISIONS

Item	NLG - 1
Location	Bauxite Bed
Upper Fluid	Nitrogen - VCM Vapor
Lower Fluid	VCM Liquid
Operating Temp., °F	-70°F to 100°F
Design Temp., °F Max.	100°F
Min.	-20°F
Operating Press., Psig	150 psig
Design Press., Psig	250 psig
Type Glass	Reflex
Length, (Approx.)	47 inches
Material	Stainless Steel
Connection	1 inch Flange

NOTE: Inlet and outlet of level glass should be equipped with a fine mesh screen to prevent Bauxite Particles from clogging the glass.