CONOCO

Interoffice Communication

To J. W. Ware

From J. G. Cole

Date November 7, 1980

Subject T-405 Tar Solids Removal

The hazardous nature of the tar solids in T-405 makes safe disposal difficult and expensive. The new Federal Resource Conservation and Recovery Act (RCRA) now precludes many formerly "acceptable" disposal methods. Following is a summary of the alternatives investigated.

The alternatives are listed in order of decreasing viability.

1. Steam Strip Tar Solids
   a) In a New Vessel
   b) In the Spare Steam Stripper
   c) In T-405
2. Incinerate the Tar Solids In-House
3. Landfill Tar Solids in Epoxy-Phenolic Lined Drums
4. Solidification of Tar Solids
5. Fly Ash Addition to Tar Solids
6. Drip the Tar Solids Into the Secondary
7. Incineration of Tar Solids by a Contractor
8. Incinerate Tar Solids in an Ocean-Going Ship
9. Deep Well the Tar Solids

Alternatives 1a, 1b, 1c, 2, 3 are the only disposal options that are both environmentally and legally acceptable and operationally feasible. They are ranked tentatively as follows in order of increasing cost: 3, 2, 1b, 1c, 1a. However, alternative 1a, Steam Stripping in a new vessel, is currently recommended as the best solution from standpoints of environmental acceptability, degree of confidence for successful operation and relative ease of operation. The alternatives are discussed in detail in the attached "Discussion of Alternatives" with reasons to accept or reject the alternative.

Please forward your comments and questions to me by November 26, 1980 so that work can begin on a disposal system.

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CC: JAD-GLF-DLD-PLF-HLH-CWT-JRH-LNW-GSH-DAP-MGJ-WVH
HJN

CCR 000039486

DISCUSSION OF ALTERNATIVES

1a) Steam Strip the Tar Solids in a New Vessel (Refer to Figure 1 - Process Flow Diagram)

The tar solids would be pumped with a screw-type pump to a new vessel. The new vessel would have a steam sparger mounted in it and vent to a water-cooled condenser. The tar solids would be batched to the new vessel, then steam would be sparged through the tar solids. The vaporized chlorinated hydrocarbons and steam would go overhead and be partially condensed against cooling water. The partially condensed material will flow to the tank farm blower knockout pot, T-412, where the vapor will go overhead through the tank farm blower to the incinerator and the liquid will be pumped to the Steam Stripper. A continuous water draw-off from the new vessel to the steam stripper will prevent a build-up of condensate in the new vessel. The EDC and heavy chlorinated hydrocarbons from S-111 will be pumped to T-902 at the incinerator for burning. The EDC or light ends injection would be necessary to wash the tar solids in T-405 to the pump suction. After the steam-out is complete, the remaining coke fines in the new vessel will be washed into a container and later landfilled.

The following new equipment would be needed:

- 1 Heat Exchanger
- 1 Moyno Screw-Type Pump
- 2 Centrifugal Pumps
- 1 Vessel, approximatley 8' diameter by 12' long

Dan Hieronymus (LCCP) and Homer Hackett have completed tests which show that steam stripping tar solids is a viable alternative.

Personnel exposure will occur when injecting light ends or EDC into T-405 for washing. However, the personnel exposure with proper precautions should be minimal when compared to other methods of clearing T-405.

Approximately 10 batches of tar solids will be pumped to the new steam-out vessel to clear T-405. The total steam requirement would theoretically be 1,200 lbs./hr. of 150 psig steam for 20 hours in the steam-out vessel and 50 lbs./hr. of 15 psig in the steam stripper for 20 hours. The above steam rates will not reflect the actual usages, but are given for comparison purposes. Heat transfer and distribution problems will increase the steam usage.

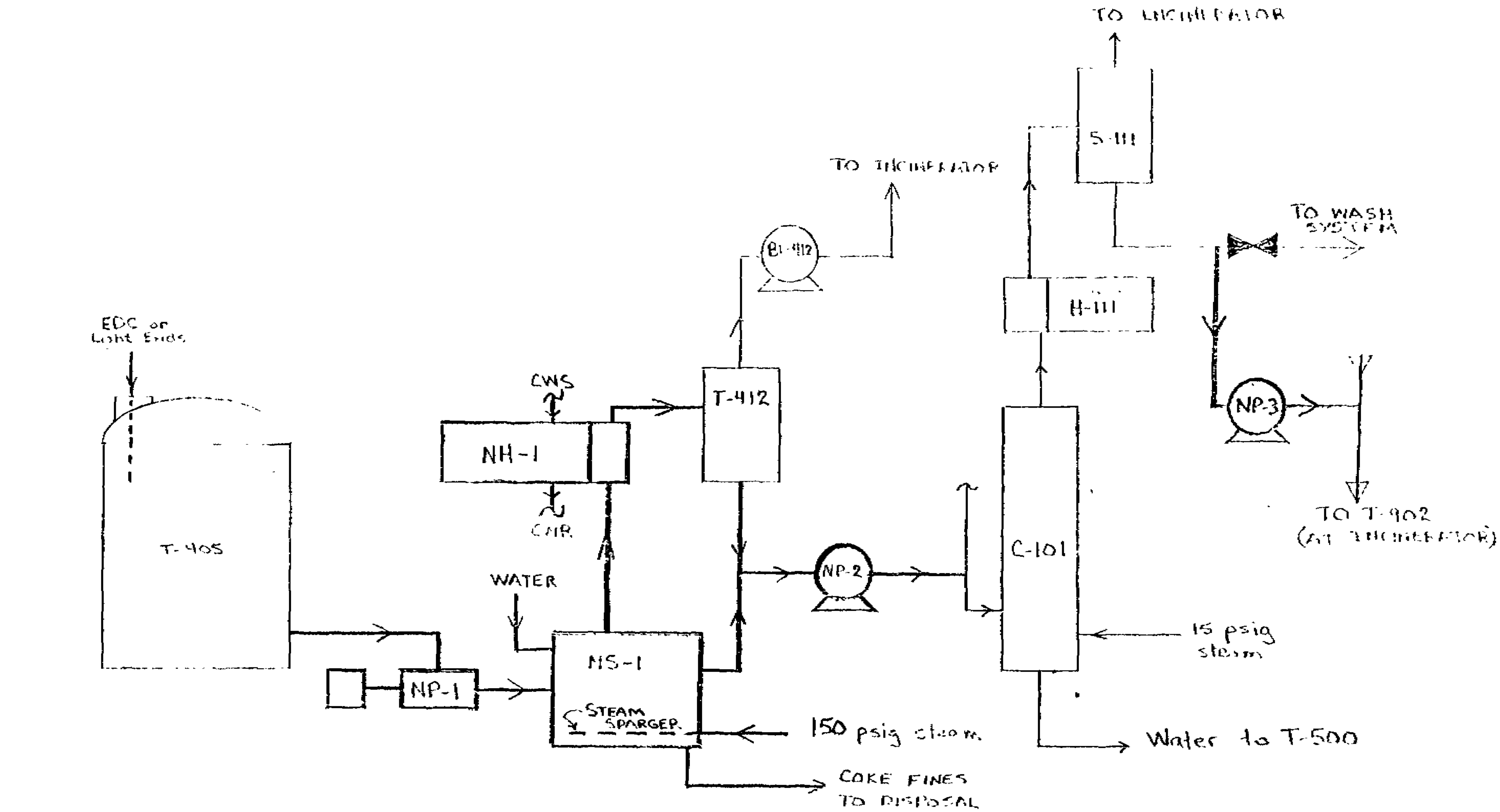


FIGURE 1

ALTERNATIVE 1a

STEAM STRIP TAR SOLIDS IN A NEW VESSEL

S-111	STEAM STRIPPER OVERHEAD K.O. POT
NP-3	S-111 LIQUIDS PUMP
T-405	TARS TANK
NP-1	MOYNO SCREW PUMP
NS-1	STEAM-OUT VESSEL
NH-1	OVERHEAD CONDENSER
T-412	TANK FARM BLOWER K.O. POT
BL-412	TANK FARM BLOWER
NP-2	STEAM STRIPPER FEED PUMP
C-101	STEAM STRIPPER
H-111	STEAM STRIPPER OVERHEAD CONDENSER

1b) Steam Strip the Tars in the Spare Steam Stripper (Refer to Figure 2 - Process Flow Diagram)

The tar solids would be pumped from T-405 with a screw-type pump and then water would be injected into the stream to slurry the material. Part of the tar solids/water stream would be returned to T-405 to wash the tar solids in T-405 to the pump suction and the rest of the stream would go to the steam stripper. The EDC from S-111 would be pumped to T-902 at the incinerator for burning. The coke fines that remain in the bottom of the steam stripper would be cleaned out and later landfilled.

Theoretically, 1,400 lbs. of 15 psig steam for 20 hours would be required in the steam stripper. The above steam rates will not reflect the actual usages, but are given for comparison purposes. Heat transfer problems will increase the steam usage.

The following new equipment would be needed:

1 Moyno Screw-Type Pump
1 Centrifugal Pump

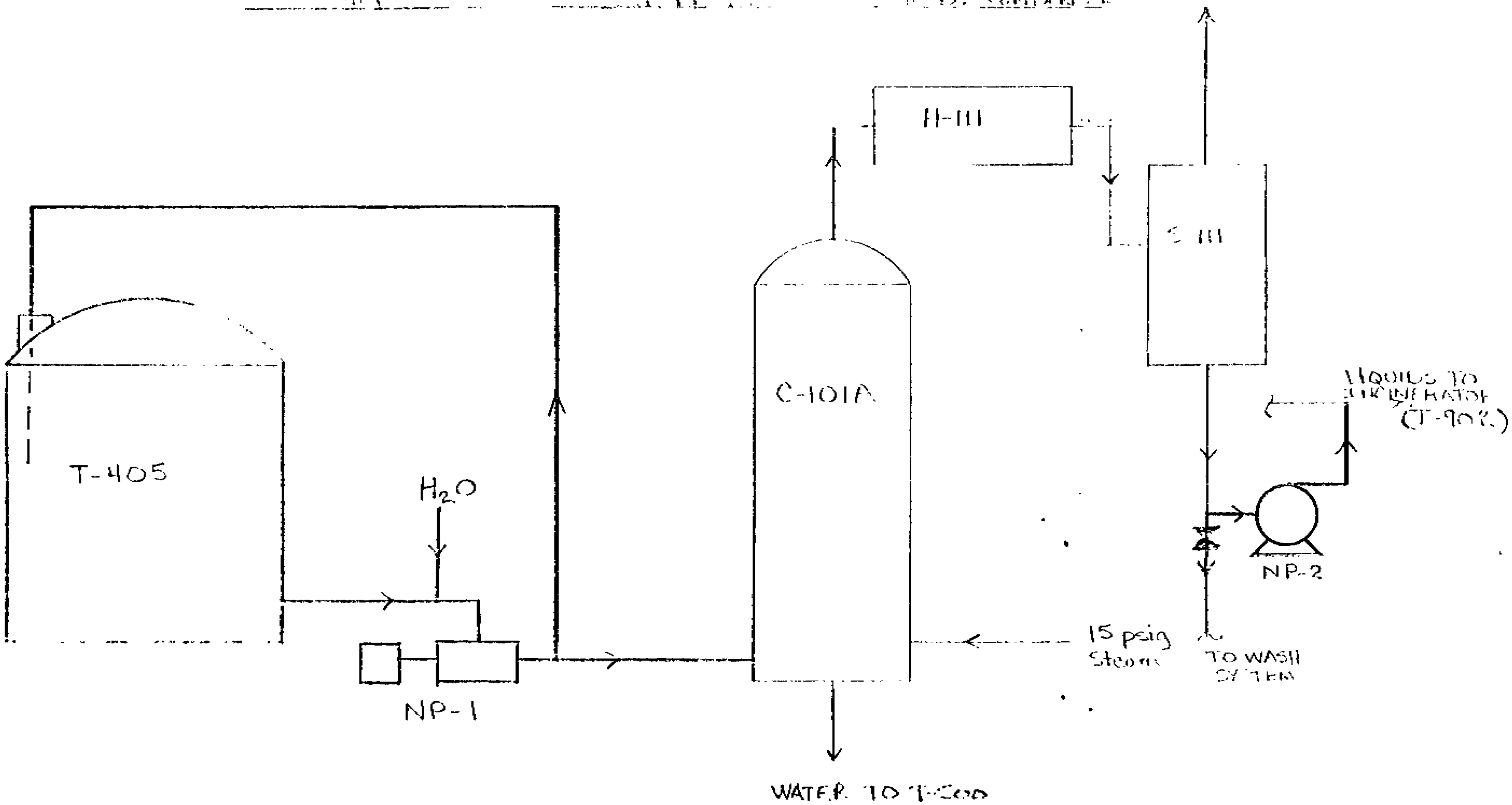
A larger crossbore graphite heat exchanger to replace H-111 may also be required. Light ends or EDC could be used instead of water to slurry the tar solids but would load up the steam stripper more and require lengthening the tank clean-out period to reduce the load on the steam stripper. This alternative was rejected because of the difficulties with transferring and introducing the tar solids into the steam stripper, the emulsion problems associated with introducing water into tars, and the possible damage to the steam stripper.

T-405
TAR TANK

NP-1
MOINO SCREW
PUMP

C-101A
SPARE STEAM
STRIPPER

H-111
STEAM STRIPPER
COND. CONDENSER



S-111
KNOCKOUT
POT

NP-2
S-111 LIQUIDS
PUMP

FIGURE 2
ALTERNATIVE 1b
STEAM STRIP TAR SOLIDS
IN THE SPARE STEAM STRIPPER

1c) <u>Steam Strip the Tars in T-405</u> (Refer to Figure 3 - Process Flow Diagram)

Steam Spargers would be placed in T-405 through the inlet nozzles and steam would be sparged through the tar solids. Vaporized chlorinated hydrocarbons and steam would go overhead and be partially condensed against cooling water. The partially condensed material will flow to the tank farm blower knockout pot, T-412, where the vapor will go overhead through the tank farm blower to the incinerator and the liquid will be pumped to the Steam Stripper. A continuous water draw-off from T-405 to the steam stripper will prevent a build-up of condensate in T-405. After the steam-out is complete, the remaining coke fines will be removed manually after opening the tank and later land-filled.

The EDC from S-111 will be pumped to T-902 at the incinerator for burning.

The following new equipment would be needed:

1 Heat Exchanger
2 Centrifugal Pumps

couldn't we rent the environmental suits

This alternative was rejected because worker exposure to tars would be high during the installation of the steam spargers and during the final tank clean-out. Also, the distribution of the steam would probably prove to be inadequate for the following reasons: 1) Uneven steam flow distribution because of the nature of the tar solids material and the size of the tank; 2) The inability to place steam spargers in all areas of the tank.

The lack of adequate steam distribution would contribute to heat transfer problems when considering the large mass and depth of the tar solids in T-405, the heat loss to the atmosphere due to the large surface area of the tank, and the limited steam input that can be obtained. Additionally, corrosion of T-405 could occur.

Theoretically, sparging 2,000 lbs./hr. of 150 psig steam into T-405 for 20 hours would clear the tank of hydrocarbons. An additional 50 lbs./hr. of 15 psig steam would be required in the steam stripper for 20 hours. The above steam rates will not reflect the actual usages, but are given for comparison purposes. Heat transfer problems will increase the steam usage.

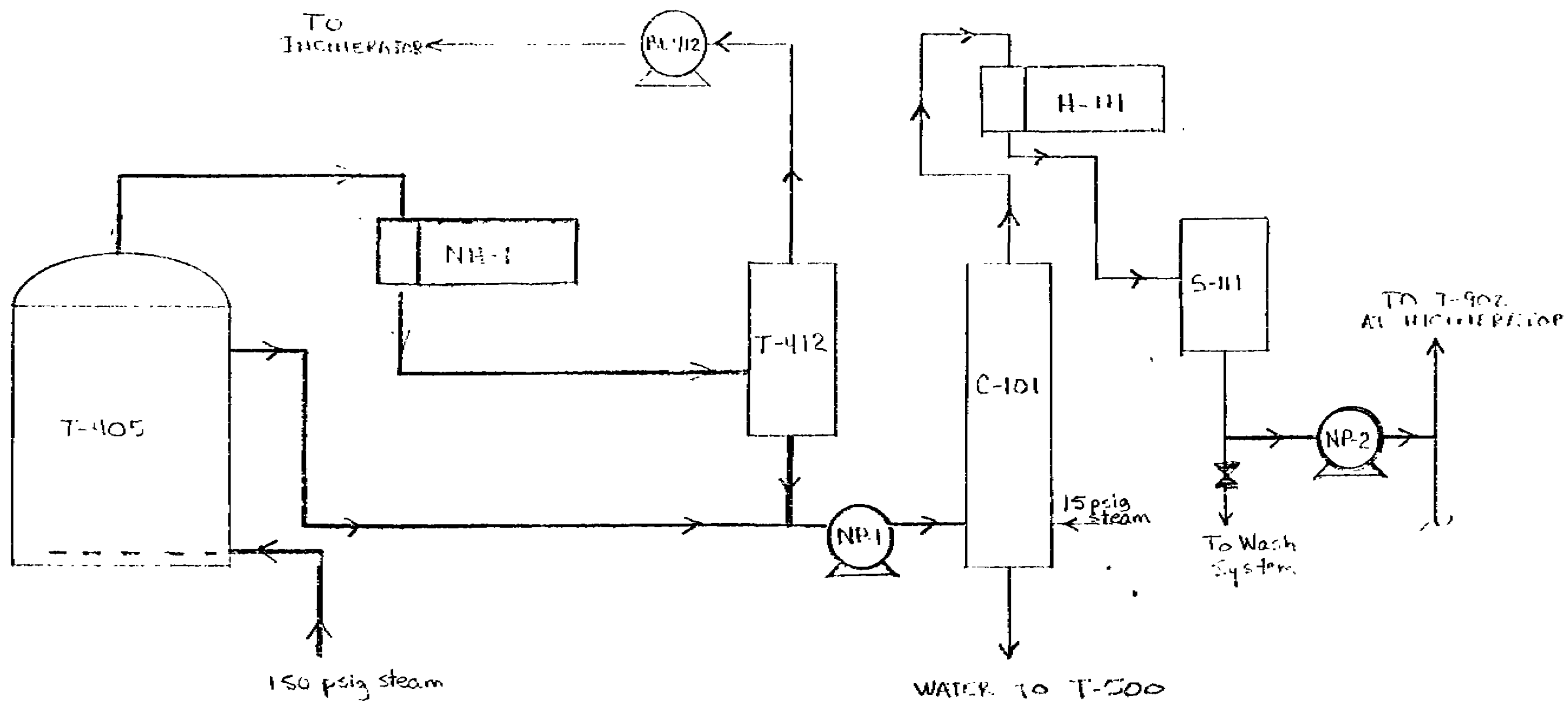


FIGURE 3

ALTERNATIVE 1c

STEAM STRIP TAR SOLIDS IN T-405

T-405	NH-1	T-412	BL-412	NP-1	C-101	H-111	S-111	NP-2
TARS TANK	T-405 OVERHEAD CONDENSER	TANK FARM VENT K.O. POT	TANK FARM VENT BLOWER	STEAM STRIPPER FEED PUMP	STEAM STRIPPER	STEAM STRIPPER OVERHEAD CONDENSER	STEAM STRIPPER OVERHEAD K.O. POT	S-111 LIQUIDS PUMP

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2) Landfill Tar Solids in Epoxy Phenolic Lined Drums

This alternative would require hiring a company to remove the tar solids manually and place the solids in epoxy-phenolic lined drums. One such company is Catalyst Technology from Houston. The workers involved in manually putting the tar solids in drums would wear environmental suits with fresh air to prevent exposure. The drums could then be landfilled and the flammable nature of the tar solids would not be a problem. However, the epoxy phenolic lining has not been tested for resistance to corrosion in this service and, therefore, I would have to assume the drums would corrode after a time. The material would then leak to the water table. The workers involved in removing the tar solids from T-405 to the drums would also risk exposure. In summary, the short and long-term adverse effects from this alternative could be appreciable.

The following new equipment would be needed:

410 Drums - $11,500
Plus cost of landfill and clearing T-405

This alternative was rejected because of the possibility of short-term exposure and long-term environmental problems.

3) Solidification of Tar Solids

Solids-Tek, Inc. from Atlanta, Georgia has devised a system to solidify the tar solids where upon they would be landfilled. VCM Lab tests dtermined that the flash point of a solidified sample is below the federal standard set for landfillable materials. Therefore, this alternative was rejected.

4) Fly Ash Addition to Tar Solids

Browning-Ferris, Inc. suggested a system whereby they would add fly ash to the tar solids to increase the temperature where the flash occurs and then landfill the material. VCM lab tests determined that the temperature where the flash occurs did not increase and, thus, is not feasible because of federal regulations and safety considerations.

5) Incinerate Tar Solids Within the Plant

This alternative would involve diluting the tar solids with light ends or EDC and then burning the mixture in the incinerator. The extreme mechanical difficulty in mixing and the host of problems that could result in the incinerator preclude this alternative. The most significant known problems are refractory and boiler tube damage from high sodium content and plugging of the liquid firing guns.

6) Drip the Tar Solids Into the Secondary

This alternative would require pumping the tar solids in small amounts to the secondary for decomposition of the organics. The salt would dissolve and exit with the secondary effluent. R. L. Huddleston of R&D pointed out that past experience would indicate tar ball formation in the secondary and, therefore, little decomposition would occur. Additionally, the secondary discharge parameter for COD probably could not be met. This alternative was rejected for these reasons.

7) Incineration by a Contractor

Rollins Environmental Company was the only contract incinerator found that would consider the tar solids. Upon examination of tar solids composition, Rollins would not agree to incinerate the tar solids because of the high sodium content.

8) Incinerate in an Ocean-Going Ship

This alternative was rejected because the tar solids have a viscosity that is too high for this company to handle.

9) Deep-Well the Tar Solids

No company would agree to deep-well the tar solids because of the incompatibility of the tars solids and the strata beneath the wellhead.