Given by Armando during the 10/1/97 meeting.

out of permit application (MM)

FLD-980-559-728

WASTE COMPATIBILITY TEST MANUAL
FOR
CHEMICAL CONSERVATION CORPORATION.
ORLANDO, FLORIDA

WASTE COMPATIBILITY TEST MANUAL
FOR
CHEMICAL CONSERVATION CORPORATION
ORLANDO, FLORIDA

TABLE OF CONTENTS
NARRATIVE

FIGURES

1.0 INTRODUCTION

The testing procedures contained in this manual are designed to resemble actual operating conditions that occur in consolidation operations and in the blending tank. The objective of this test is to determine if waste streams intended for consolidation and blending may set off a reaction before they are mixed together. A positive incompatibility test result does not necessarily indicate waste streams that tested positive are to be banned from consolidation or blending. The result will lead to a more exhaustive evaluation to establish the magnitude of the expected reaction and ways to avoid it or minimize it, if possible, within permissible health and safety limits.

Another performance pursued in this test is to impose as little burden as possible on the existing sampling and testing process. The extent of the additional burden created by this test depends on the way it is planned and conducted. This manual seeks to develop a plan that is easy to follow and keeps the tasks small in size and number.

2.0 OPERATIONS DESCRIPTION

Consolidation of waste takes place at three locations in the facility while blending of waste for fuel occurs in the blending tank. The three waste consolidation locations are the wastewater tank storage unit, the consolidation pad and the consolidation area. Acidic and non-corrosive wastewater is removed from inbound containers and transferred into tanks in the wastewater tank storage unit (acidic and non-corrosive wastewater storage tanks) or into tote tanks in the consolidation pad. In the consolidation area, liquid and solid waste is consolidated into containers (tote tanks, 55-gallon drums or smaller size containers). Acidic and non-corrosive wastewater storage tanks, the consolidation pad, the consolidation area and the blending tank are identified in Figure 2-1.

There is a concern about the compatibility of acidic wastewater that arrives in inbound containers and the one stored in storage tanks. Acidic wastewater is pumped out of inbound containers and into storage tanks. A compatibility test is needed to insure that

Exhibit:	II.A.5/6.-1
Revision:	0
Date:	06/15/97
Page:	214d

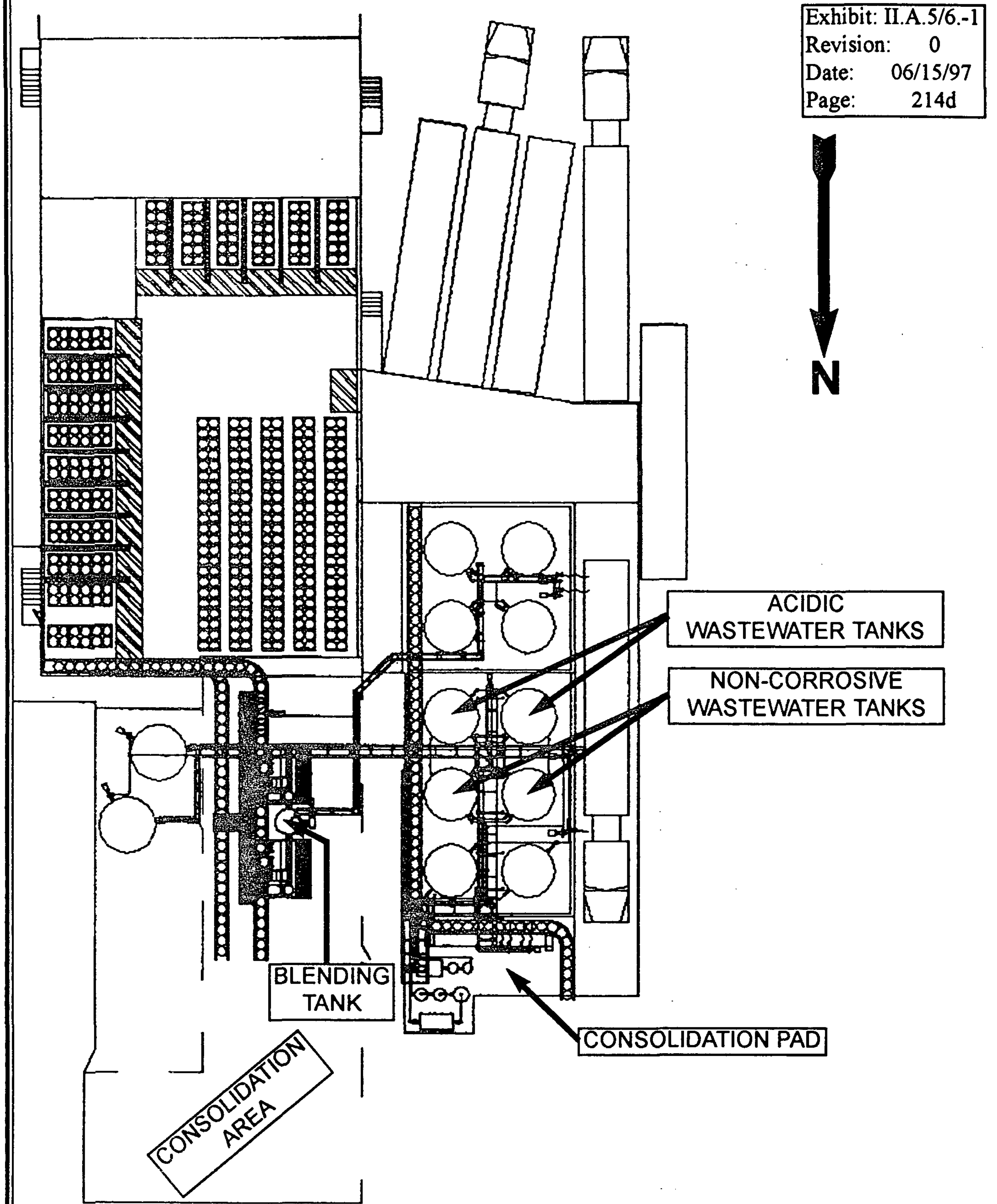

FIGURE 2-1
WASTE CONSOLIDATION AND BLENDING LOCATIONS

the waste material held in containers is compatible with the one stored in the tanks before they are mixed together. The same concern applies to non-corrosive wastewater that is transferred from inbound containers and into storage tanks.

Operations in the consolidation pad present a compatibility problem analogous to the one described in the previous paragraph. However, in this case, acidic and non-corrosive wastewater arriving in inbound containers is transferred into tote tanks rather than into storage tanks.

Waste consolidated in the consolidation area may be labpacks or waste of similar type that arrives in containers that are not full or that is placed into a larger container with the intent to take advantage of the space available in a shipping or transportation container. The meaning of shipping container applies to pails, drums, tote tanks and other relatively small size containers that can be moved around by hand, with drum carts or forklift trucks. Transportation container refers to a larger size container where waste is transported in bulk like a roll-off box, dump trailer and tank trailer (tanker).

Fuel blending operations consists of removing organic waste from inbound containers and blending it in a tank to produce a homogeneous mixture that may be used as a fuel supplement. A compatibility test must be performed on each waste stream before contents from drums are dumped into the blending tank.

3.0 TEST CRITERIA

Incompatible materials are seldom present among a group of wastes that have been selected because they are similar in type. The cause of this occurrence is usually due to an anomaly in the identification of the name or property of materials. They will react with almost every other waste stream in a batch that is consolidated or blended for fuel. The intensity of the reaction between an incompatible waste and each waste stream in a consolidation or blending batch will depend on the concentration levels and type of components present in them.

The operation of fuel blending is the one posing the greatest compatibility concern because of the ignitable characteristic of the components in waste fuel. Therefore, compatibility test procedures for waste fuel deserve the highest consideration.

Compatibility test procedures designed to prevent chemical reactions in consolidation operations will be given proper consideration. However, consolidation operations present a somewhat less critical scenario than the one posed by fuel blending. The effect of pumping an incompatible waste into an acidic or non-corrosive wastewater storage tank will result in generation of toxic and/or flammable gas, and/or an exothermic reaction. Toxic and flammable gas generated in acidic and non-corrosive wastewater storage tanks is treated by an emission control equipment before it is released to the atmosphere. The mass of non-combustible liquid stored in these tanks is expected to dissipate the heat released by an exothermic reaction before the temperature of the tank contents and its walls reach a high level.

Chemical reactions caused by an incompatible waste during operations conducted in the consolidation pad and consolidation area will have consequences similar to the ones described in the previous paragraph. Gases released from consolidating waste into tote tanks and drums will be treated by an emission control equipment before they are discharged to prevent them from causing injury or damage on-site and off-site. The effect the liquid mass in tote tanks and drums has on dissipating heat from exothermic reactions will be not the same as in storage tanks because of the difference in volume. However, the smaller volume of the wastes involved in these operations reduces the risk associated with them.

Many of the waste streams consolidated in the consolidation area arrive at the facility in labpacks, which consist of small containers (inner containers) overpacked into a larger container. The size and type of inner containers range from vials containing a few milliliters to 5-gallon pails. Consolidation of waste in inner containers having a volume that equals or exceeds half a gallon is subject to the compatibility test described in this manual. This volume amount has been selected because it is close to the volume of a waste sample used in the compatibility test. Waste in an inner container having a volume smaller than half a gallon is consolidated in a mixing container not exceeding 2.5 gallon in size before they are transferred to the final larger shipping container. Large inner containers may be divided in several portions smaller than half a gallon and consolidated in alternate mixing containers in order not to be subject to a compatibility test. This method of consolidation reduces the consequences of an incident because of the small volume of waste involved.

Waste in solid form is consolidated in the manner described in the previous paragraph. The test procedures explained in the next section of this manual only applies to waste in liquid state. Consolidation of solids occurs on labpack wastes, wastewater treatment sludge from electroplating operations and when filling partially full containers.

4.0 TEST DESCRIPTION

This manual emphasizes more on waste to be processed for fuel than other waste types because they present a higher degree of risk. However, similar procedures are used on samples of wastes that are consolidated in the wastewater tank storage unit, consolidation pad and consolidation area.

4.1 Waste Fuel Blending

The facility collects samples from wastes at the time a shipment is received at the site. The sample is utilized to conduct tests to determine chemical and physical properties of inbound wastes. A fingerprint or field test described in sub-section 6.0, Waste Verification Process of the Waste Analysis Plan provides information on the pH value, specific gravity, viscosity, solid layer thickness and capacity to sustain combustion. The first four pieces of information mentioned in the last sentence are determined in the drum staging areas. The sample is subsequently taken to a booth where the last parameter is evaluated by performing a burn test. The size of the sample left after the burn test is large enough conduct the compatibility test. The compatibility test is performed on the waste sample after the burn test.

Samples from wastes that arrived in the shipment are combined in a test vessel after the burn test is complete. Samples similar in volume are combined in the test vessel one after another within the shortest possible period of time to achieve the maximum effect of a reaction. This part of the test is designed to detect any reactions that may occur if all waste streams in the truck load were mixed together. At this point, a reading of the mixture temperature, time, observation of gases emanating from the mixture, bubbling action in the mixture, and any other visual observation that may indicate a reaction is taking place is entered in the log shown in Figure 4-1. This part of the compatibility test is labeled STEP A.

The next step labeled STEP B consists of adding to the existing mixture that results from STEP A a sample of the waste stored in the tanks. The sample size should be about two times larger than the STEP A mixture and representative of the waste currently stored in the tank. Another record of the mixture temperature, time and visual observations, as described for STEP A should be entered in the log. This step of the test is designed to determine the compatibility of waste streams in the truck load with waste stored in the tanks. A reading of the ambient temperature and its reading time is completed in STEP C, which should be entered in the log immediately after STEP B.

STEP D and STEP E consist of recording in the log the temperature, time and visual observations fifteen and thirty minutes, respectively, after temperature and time readings are entered in the log in STEP C. It is suggested that a time alarm watch or clock be used to keep the fifteen and thirty minute time period consistent for every compatibility test. Ambient temperature is to be recorded during last two steps.

The next step labeled STEP B consists of adding to the existing mixture that results from STEP A a sample of the waste stored in the tanks. The sample size should be about two times larger than the STEP A mixture and representative of the waste currently stored in the tank. Another record of the mixture temperature, time and visual observations, as described for STEP A should be entered in the log. This step of the test is designed to determine the compatibility of waste streams in the truck load with waste stored in the tanks. A reading of the ambient temperature and its reading time is completed in STEP C, which should be entered in the log immediately after STEP B.

STEP D and STEP E consist of recording in the log the temperature, time and visual observation fifteen and thirty minutes, respectively, after temperature and time readings are entered in the log in STEP C. It is suggested that a time alarm watch or clock be used to keep the fifteen and thirty minute time period consistent for every compatibility test. Ambient temperature is to be recorded during last two steps.

4.2 Wastewater Tank Storage Unit

Acidic and non-corrosive wastewater will be sampled and tested for compatibility in groups of eight to fourteen drums. This is the number of drums that can be accommodated on the section of the drum conveyor that runs along the Northern containment wall of the wastewater tank storage unit.

FIGURE 4-1

COMPATIBILITY TEST LOG
CHEMICAL CONSERVATION CORPORATION

OPERATOR NAME ______________________________

TEST DATE ____________________ TRUCK LOAD NO. ______________

STEP	TIME	MIX. TEMP	AMB.TEMP.	OBSERVATIONS (Write None if no reaction effects observed)
A				
B				
C				ADD 10% TO AMB.TEMP. AMB.TEMP. + 10% =
D				
E				

RESULTS

1. IS STEP A MIX.TEMP. (______) AMB.TEMP. + 10% (______)? NO___ YES___
   WERE REACTION EFFECTS OBSERVED IN STEP A? NO___ YES___
2. IS STEP B MIX.TEMP. (______) AMB.TEMP. + 10% (______)? NO___ YES___
   WERE REACTION EFFECTS OBSERVED IN STEP B? NO___ YES___
3. IS STEP D MIX.TEMP. (______) AMB.TEMP. + 10% (______)? NO___ YES___
   WERE REACTION EFFECTS OBSERVED IN STEP D? NO___ YES___
4. IS STEP E MIX.TEMP. (______) AMB.TEMP. + 10% (______)? NO___ YES___
   WERE REACTION EFFECTS OBSERVED IN STEP E? NO___ YES___

INSTRUCTIONS: IF ANY OF THE YES BOXES IN THE RIGHT HAND COLUMN ABOVE HAS BEEN CHECKED, PLEASE ADVISE THE FACILITY MANAGER IMMEDIATELY.

A wastewater sample is collected from the first inbound container in the group and tested for the parameters described in sub-section 6.0, Waste Verification Process of the Waste Analysis Plan. After the waste verification test is complete, the sample is poured into the vessel to test for compatibility. Previously, a wastewater sample taken from the storage tank has been poured into the test vessel. A sample is collected from the second inbound container in the group and the waste verification and compatibility test is conducted in the manner described in the first two sentences of this paragraph. Wastewater in all the other inbound containers in the group is sampled and tested the same way.

Acidic wastewater is an aggressive type of waste that reacts quickly to the presence of incompatible waste. A reaction caused by mixing a sample collected from an incompatible waste with acidic wastewater samples will be noticed immediately. On the other hand, non-corrosive wastewater is the opposite of acidic wastewater. It consists of an inert material containing organic and inorganic constituents in low concentration levels. It requires a highly incompatible material to set off a reaction with non-corrosive wastewater. Such a reaction will have consequences that will be noticed immediately. Therefore, the fifteen and thirty-minute waits for a reaction to develop is not included in steps of the compatibility test for acidic and non-corrosive wastewater for this operation. However, as explained in the previous paragraph and in the one below, test procedures provide a time period long enough to allow a reaction to manifest itself.

The sequence followed in pumping wastewater from containers will be the same as the one used in pouring corresponding samples in the test vessel. This way, a considerable time period will elapse between the moment a sample is poured into the test vessel and the corresponding wastewater is pumped into the storage tank. In most instances, this time period may be even longer than the wait time specified for steps D and E in the compatibility test for fuel blending.

The log used to record results from a compatibility test performed on acidic and non-corrosive wastewater before they are pumped into storage tanks is illustrated in Figure 4-2. The mixture temperature shown in this log refers to the temperature reading taken on the mixture after the verification test has been completed on a waste sample of the next inbound container to be tested, but before it is poured into the test vessel. This will allow an additional time period to detect a reaction in the mixture before the waste is pumped into the tank.

4.3 Consolidation Area and Consolidation Pad

Consolidation operations at these locations are similar to the ones conducted in the wastewater tank storage unit. The only difference between these operations is the volume of the receiving vessel. In the storage unit the receiving vessel is a tank as opposed to a tote tank or a drum in the consolidation pad and area. The same compatibility test procedures designed for consolidation operations in the wastewater tank storage unit are used in operations that take place in those two locations. The only deviation affecting these procedures is that a sample collected from waste in tote tanks and drums is placed in the test vessel instead of the one from the storage tank. However, most consolidation operations do not require this sample because they usually begin with an empty tote tank or drum. The log shown in Figure 4-2 is utilized to record results from this test.

5.0 HEALTH AND SAFETY CONSIDERATIONS

The following precautions and personnel protection equipment should be used when conducting the compatibility test:

Respiratory: Respirators are not needed as long as there is an exhaust fan removing fumes and gases from the test area; otherwise, respirators equipped with cartridges for organic vapor or acid gas should be used for fuel blending or waste consolidation, respectively.

Head Protection: None is needed unless to hold the face shields.

Face Protection: A face shield or full mask respirator should be worn.

Hand Protection: A latex or rubber glove covering up to the wrist or to the elbow should be worn for fuel blending or waste consolidation, respectively.

Body Protection: A level D protection clothing (same as the one used for normal plant operations) should be worn.

Precautions: In case gas generation or bubbling action is observed, the exhaust fan should be left on, the test area should evacuated and nearby personnel should be advised that gases with toxic and/or flammable characteristics are being generated, urging them to keep away and restrict ignition sources.

FIGURE 4-2
COMPATIBILITY TEST LOG
CHEMICAL CONSERVATION CORPORATION

OPERATOR NAME______________________________TEST DATE_______________

IF A MIX.TEMP READING EXCEEDS AMB.TEMP BY MORE THAN 10% FOR ANY DRUM TEST, STOP CONSOLIDATION OPERATION AND ADVISE SUPERVISOR

DRUM I.D. NO.	TIME	MIX. TEMP	AMB. TEMP	COMMENTS (enter None if no reaction observed)

ADD 10% TO LAST AMBIENT TEMPERATURE RECORDED ABOVE: AMB. TEMP +10% = _____

IS LAST MIX. TEMP. RECORDED ABOVE GREATER THAN AMB TEMP +10% ? YES____NO____

IF ANSWER ABOVE IS YES, STOP CONSOLIDATION OPERATION AND ADVISE SUPERVISOR

6.0 TEST EQUIPMENT

The following equipment should be used for conducting the compatibility test:

— Testing vessel

— Alarm clock or watch

— Ambient temperature indicator

— Mixture temperature indicator

7.0 INDICATION OF SUSPECTED REACTANTS

An increase in temperature of the mixture as recorded in STEP D and STEP E of 10% over the ambient temperature recorded in STEP C is an indication that there may be reactants in the mixture. A generation of gases from the mixture or a bubbling action in the mixture is an indication that there may be reactants in the mixture.

8.0 EVALUATION OF SUSPECTED REACTANTS

Compatibility test results indicating the presence of reactants, an evaluation of waste streams in the shipment or group of drums will be made to identify the reacting waste streams and determine the type and magnitude of the reaction. Considering results from the evaluation, a decision should be made whether it is advisable to search for ways and methods to conduct the blending or consolidation of the reacting waste streams. This operation should be conducted in a manner that eliminates or minimizes the reaction effects under permissible safety and health limits. The decision to proceed with the blending or consolidation of suspected reactants is made by the Facility Manager following the criteria described in the paragraph below.

Reacting materials will be classified with reaction codes depending on the consequences described in the table shown below. Only reacting materials classified with Reaction Codes H and G will be considered for mixing.

Reaction Codes and Consequences

Reaction Codes	Reaction Consequences
H	Generates heat by chemical reactions
F	Produces fire from extremely exothermic reactions, ignition of reaction mixtures or of the reaction products
G	Generates innocuous gases such as nitrogen gas (N_2), carbon dioxide (CO_2), etc.
GT	Generates toxic gases such as hydrogen cyanide (HCN), hydrogen sulfide (H_2S), etc.
GF	Generates flammable gases such as hydrogen gas (H_2), acetylene (C_2H_2), etc.
E	Produces explosion due to extremely vigorous reactions or reactions producing enough heat to detonate unstable reactants or reaction products
P	Products violent polymerization resulting in the generation of extreme heat and sometimes toxic and flammable gases

9.0 TEST ACCURACY

There are factors that may affect the accuracy of this test in predicting the existence of reactants among waste streams to be processed for fuel or consolidation. Even if reacting waste streams are discovered and their reaction is avoided, the possibility of having a reaction in the blending tank, storage tank, tote tank or drum is still present. The following factors or circumstances may affect the prediction of a reaction in the blending tanks:

a) Waste stream A and B set off a mild reaction that may go unnoticed in the test, but will set off a violent reaction if the size of A, the reactanct, is considerable larger than B.

b) Waste stream A and B may react mildly and form compound 1 under certain conditions not duplicated in the compatibility test. The resulting compound 1 will react violently with waste stream D that is part of the same shipment to which A and B belongs.

To put together the Compatibility chart. These were things mixed in the tank that had the release that appear to be incompatible. NM

Chemical	Reactivity Group
Hydrochloric Acid	1
Phosphoric Acid	1
Sulfuric Acid	2, 107
Hydrofluoric Acid	1, 15
Stannous Chloride	24, 107
Ferric Chloride	RGN not available
Iodine Solution	104
Chromerge	
p-Toluenesulfonic Acid	RGN not available
Dimethyl Sulfate	RGN not available
Hydrochloric Acid/Cobalt Chloride	1, 24
Fluoride Paste	15
Fluoboric Acid	1, 15
Chromic Acid	2, 14, 104
Sodium Bisulfate	
Sodium Thiosulfate	105
Thiosulfate	

1 + 15 - Mineral Acid + Fluorides

Most inorganic fluorides yield toxic and corrosive hydrogen fluoride gas upon reaction with strong mineral acids

1 + 104 - Mineral Acid + Strong Oxidizing Agents

Many combinations of strong mineral acids and strong oxidizing agents are sensitive to heat and shock and may decompose violently. The halogen acids may be oxidized yielding highly toxic and corrosive halogen gases accompanied by heat generation

1 + 105 - Mineral Acids + Strong Reducing Agents

Many reducing agents form flammable hydrogen gas on contact with mineral acids. The heat generated can cause spontaneous ignition. Some reducing agents such as metal phosphides and inorganic sulfides evolve extremely toxic and flammable fumes of phosphine and hydrogen sulfides, respectively.

1 + 107 - Mineral Acids + Water Reactives

Group 107 compounds not only share the characteristic that hazardous consequences can result from their contact with water, they are also extremely reactive with most of the other compounds listed. In many cases much heat is generated along with toxic or flammable gases, or both. Explosions may occur, or highly unstable mixtures may result. For this reason, it is recommended that Group 107 compounds be completely isolated from other compounds. Many of these group 107 compounds are also pyrophoric, especially those which are also classified as strong reducing agents.

2 + 15 - Oxidizing Mineral Acids + Fluorides
Gaseous hydrogen fluoride can result from a combination of inorganic fluorides and these acids. Hydrogen fluoride is extremely corrosive and toxic. Some heat can also be evolved.

2 + 105 - Oxidizing Mineral Acids + Strong Reducing Agents
Mixing of compounds in these two groups can result in violent, extremely exothermic reactions. Fires and explosions can result.

104 + 105 - Oxidizing Agents + Strong Reducing Agents
These compounds can react with explosive violence upon contact

104 + 107 - Oxidizing Agents + Water Reactives
See Combination 1 + 107

105 + 107 - Reducing Agents + Water Reactives
See Combination 1 + 107