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Post Natural Phenomena Event Priorities for Structural Investigations in the Tank Farms

S. E. Lindberg

Fluor Daniel Northwest, Inc.

Richland, WA 99352

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**POST NATURAL PHENOMENA EVENT PRIORITIES
FOR STRUCTURAL INVESTIGATIONS IN THE TANK FARMS**

**S.E. Lindberg
Fluor Daniel Northwest, Inc.
Richland, Washington**

May, 1997

POST NATURAL PHENOMENA EVENT PRIORITIES FOR STRUCTURAL INVESTIGATIONS IN THE TANK FARMS

1.0 Purpose

The purpose of this task is to prioritize the tanks and tank farms having the greatest potential for structural damage following a significant natural phenomena. An event of sufficient magnitude could cause widespread structural damage throughout the tank farms. The damage caused by a seismic event may not be observable because many components such as transfer lines, tanks, or process pits are underground. Or, components over the waste tanks may be involved, with damage to ventilation system housings, or exhaust stacks. When requested to enter the tank farm facilities to inspect for structural damage due to natural phenomena, the investigating team needs to have previously considered the priorities of their actions so that they can complete their work in a timely fashion. Some aspects to be considered include the safety of the inspection team itself, the tank farm workers safety, environmental hazards, and the potential for hazardous materials affecting the public. The various tank farm facilities contain a significant amount of hazardous materials, both radiological and toxic.

This activity reviewed the current safety envelope of all of the waste tanks and determined a priority of inspection assuming all tanks were subject to a significant natural phenomena.

2.0 Scope

The scope of this study includes all of the tank farm facilities within the farms themselves. There are 177 waste tanks in 18 tank farms. The physical scope of this study is limited to:

- Single-shell tanks (SSTs)
- Double-shell tanks (DSTs)
- Catch tanks in the tank farms
- Miscellaneous Underground Storage Tanks (MUSTs) in the tank farms
- Waste transfer systems in the tank farms.

3.0 Prioritization Methodology

To develop a prioritized structural inspection list, several steps are followed. The potential damage to the waste tank facilities in response to severe natural phenomena was reviewed, and priorities for inspection are proposed based on safety of the facility workers, on-site workers, and the public. A list of individual tanks and their characteristics such as whether or not the tank is included on a watchlist or if the tank is a known leaker, has been included. The waste tank histories were reviewed as well as the waste inventories; these are also incorporated in the list. An analysis of the 177 tanks was performed, and the attributes were ranked in order of importance to the safety functions of the tank farm facilities. The potential effects of years of high level waste storage on the tank structures were also considered. The various rankings are summed, and a prioritized list of individual tanks was developed to be used by the structural inspection team.

A prioritized list of the 18 tank farms is also developed from the list of individual tank priorities.

4.0 Assumptions

The following assumptions are used in the analysis:

1. The study covers natural phenomena events that have the potential to affect all tank farms. Other types of events may only damage one or two farms, these events have not been included because they do not need to be prioritized.
2. The greater the inventory of high level waste in a tank, the greater the consequences of a gas release event (GRE) and deflagration following a severe seismic event.
3. Interim stabilized SSTs have less than 5000 gallons of pumpable liquid remaining in them, therefore the potential for a large spill from a ruptured interim stabilized tank is minimized.
4. If a waste tank normally has an operating active ventilation system, the assumption is that the ventilation system is **needed** to maintain cooling and confinement, so the loss of the ventilation system increases the ranking of its associated tank.

5.0 Assessment of Natural Phenomena

The Tank Waste Remediation System (TWRS) Basis for Interim Operation/Final Safety Analysis Report (BIO/FSAR) Natural Phenomena analysis identified high winds, lightning, and seismic events as potential significant hazards. For this analysis the lightning scenario has not been studied further because, though lightning strikes may cause a loss of power, or start fires, these are not scenarios that would be of concern for an area-wide structural inspection.

High winds also are not a significant concern for this study. There is a Standing Order (#97-04) in the tank farms which instructs the operations staff in precautions for high wind conditions. Historically the tank farms have **safely** withstood sustained winds in excess of 128.75 km/h (80 mi/h). Because of this fact, the Emergency Response Guide for high winds in the tank farms has been deleted.

Another natural phenomena that was considered in the BIO/FSAR but its consequences were not found to be significant, is volcanic eruption and ashfall. The major detrimental effects of the ashfall are the abrasion of rotating machinery and ash buildup on inlet filters. These would not be the subject of a structural investigation following the volcanic eruption. Another concern with ashfall is the weight of the ash if a large amount is deposited on top of the waste tanks. A six inch layer of dry ash weighs about 25 pounds per square foot. It is capable of absorbing up to 10 pounds per square foot of water, for a total of 35 pounds per square foot. This weight has the potential of causing building roof distress, but would not cause a failure of the tank domes.

The case of a seismic event is the main concern for potential structural damage in the tank farms. An earthquake could cause several types of damage

throughout the farms. A seismic event could damage many components in the various farms simultaneously. Potentially, the damage could result in:

- spray leaks in jumper pits or pump pits if a waste transfer is in progress and the jumper connections are damaged,
- the earthquake could cause the mixing or rollover of tank waste which could release entrapped flammable gases into the tank dome, a GRE. If the release caused a build-up of flammable gases beyond the lower flammability limit (LFL) a spark that is also generated by the seismic activity would result in a deflagration in the waste tank. Even if the GRE did not exceed the LFL in the tank dome, precautions need to be taken following a significant seismic event to prevent spark sources in potential pockets of high flammable gas.
- An underground high level waste tank could crack and allow a subsurface waste leak.
- Ground level components such as ventilation systems exhaust fan and filter housings, or exhaust system stacks could be damaged or toppled during a seismic event of sufficient magnitude.

6.0 Inspection Priorities

After a significant seismic event there is a high probability of LFL amounts of flammable gases in many waste tank domes. Extreme caution needs to be taken to avoid injuring the inspectors, and to prevent any spark sources during the structural inspection until the flammable gas concentration is known. The possibility also exists that some tanks may have experienced a flammable gas deflagration caused by the seismic event. The earthquake can result in a significant GRE as well as causing ignition sources in the tanks as components may have the potential to swing around and strike each other during the events. In this second case, the vent system HEPA filters may be damaged, and extreme care must be taken to protect those entering the tank farms to prevent inhaling hazardous materials that may have been blown out of the damaged filter path.

There are two primary functions of the high level waste tanks and their associated facilities in the tank farms. The hazardous waste must remain cool enough that it does not boil or cause a tank bump, and the hazardous waste must be confined inside controlled areas to prevent injuring the facility worker, onsite workers, and the public. A significant seismic event can cause the disruption of the cooling and confining functions of the tank farm facilities. The structural inspection team should first look for any damaged components whose function is to cool the tank contents or to confine the hazardous materials inside the tanks.

The first priority should be to maintain, or restart any cooling, and provide a cooling and filtration path for tank air to move, i.e., to open any blocked air pathways from normally actively ventilated tanks or passively ventilated tanks. The components of interest then would include:

- active ventilation systems, comprised of:
 - fans
 - ductwork, exhaust stacks

- HEPA filters
- filter housings
- tank penetrations such as process pits and their associated coverblocks, used to supply air to the waste tank
- passive ventilation systems, comprised of:
 - HEPA filters
 - filter housings
 - air supply housings

Another concern following a seismic event arises if a waste transfer was in progress when the earthquake occurred. The ground movement could potentially damage the underground transfer lines and the connectors and associated piping that run through the process pits. Damage to the underground lines could eventually cause a surface pool, but would most likely stay under the ground level surface. However, damage in the process pits if a coverblock was crushed to an extent that the process pit was exposed, could allow a spray leak to occur. The first priority for the operations personnel who are performing the transfer procedure is to stop the transfer by shutting off the transfer pumps.

One consequence of a substantial seismic event could be cracking or a large split in an underground waste tank. The DSTs were all designed and built to withstand a 0.25 g seismic event. A review of the criteria used in the design and construction of the SSTs determined that they will withstand a ground acceleration of 0.20 g. The SSTs have only one wall as a containment barrier so the waste would be released underground. The DSTs have a secondary tank to contain any leakage from the primary tank, so both tanks would have to be damaged in order to release the waste to the soil. In either case the leaking waste would be covered by a minimum of 15-55 feet of packed soil. The damage would not be obvious from the ground level other than by level instrument readings or radiation probe instruments inserted in the ground. In general, the tanks most likely to be damaged, the SSTs, have the least amount of waste that could leak out of a damaged tank. Many of the SSTs have been interim stabilized to remove most of the liquid in the tank. In fact, there is only one of the 149 SSTs that has greater than 37,000 gallons of supernate (liquid) waste. The solids in any SST are not likely to flow out to the soil even if the tank wall is cracked. So, though a split in the wall or bottom of a waste tank would be a costly and difficult problem to clean up, the safety implications for the worker or public are minimal.

All of the above concerns are considered in developing the prioritized list of tanks and tank farms.

It is assumed that the inspection team will have a radiation protection technician accompanying them to warn of hazardous dose rates and minimize exposures, as well as a member of the tank farms operating staff that knows the normal components' functions and status of the farms and transfer systems.

The scope of this analysis includes all of the components located in the tank farms. Some smaller underground tanks are considered but not included in the priority lists because they are very small compared to the high level waste tanks, or they are only used during waste transfers. The small tanks could be damaged in a seismic event, but the consequences are extremely small compared to the large waste tanks. For the case of the tanks used in waste transfers, they also are small compared to the large waste tanks, and they

would have a smaller chance of having a large GRE that could potentially cause a deflagration.

7.0 Prioritized List for Structural Inspectors

7.1 Individual Tank Priorities

To develop a priority list for structural inspections in the tank farms following a seismic event, many items are considered. These include the status of the waste tanks as watchlist tanks, the amount of waste in the tanks, whether they are SSTs or DSTs, if the SSTs have been interim stabilized, the age of the tanks, the types of waste stored in the tanks, and whether or not the tanks are actively or passively ventilated. The data are shown on Table A-1 in Appendix A.

The numbers in the second column, **Vent System Rank**, are assigned according to the normal ventilation status of the associated tank. If the tank normally has an active ventilation system for cooling and confinement, the tank was assigned a '5'. If the tank normally uses a passive breathing ventilation system, and the tank is on the watchlist for flammable gas, it was assigned a '4'. If the tank normally uses a passive breathing system and it is a watchlist tank but not for flammable gas, then it is assigned a zero (0). The rest of the tanks have a dash (-) listed in this column. The rankings of 5, 4, and 0 are chosen to indicate the importance of the operable ventilation systems and their association with the prevention of a buildup of flammable gas in the tank domes as well as the cooling function.

Column three (3) in Table A-1, **Inventory Rank**, accounts for the inventory of high level waste in the waste tank. The greater the amount of inventory in the waste tank, the greater the amount of flammable gas that can be generated, or the greater risk of the inventory of waste in the tanks turning over and releasing a large amount of trapped flammable gas. Also, the greater the inventory, the greater the amount of waste that could spill in the case of a split tank. The risk of spilling a large amount of waste is much greater if there is a large inventory to be spilled. The rankings of 4, 2, and 0 are based on the increasing risk with a larger inventory.

The inventory ranking is based on the following:

- Rank 4 = $\geq 50\%$ of the total capacity of the tank is filled
- Rank 2 = 10-49.9% of the total capacity of the tank is filled
- Rank 0 = $< 10\%$ of the tank is filled.

An 'X' in column four (4) indicates that the tank has been assigned to a watchlist. Those not assigned to a watchlist just have a dash (-) in this column. The assignment to a watchlist indicates that the tank has a higher probability of a deflagration or fire caused by a seismic event, or that the tank contains very high temperature waste that has potentially caused stress to the tank wall.

The fifth (5) column is for **Tank leaks**. The tank is assigned a value rank of four to account for being a known leaker. If the tank is a leaker, the integrity is already questionable, and a seismic event could potentially increase the area damaged. The ranking of four for this column is to show the

importance of a tank with a split already in it and the risk of the crack increasing due to a seismic event.

The sixth (6) column accounts for those tanks that were allowed to **Self-concentrate**. The tanks indicating 'boil' were allowed to boil as a means of cooling, this only includes SSTs. These tanks are assigned a value rank of three to account for the structural stress to the tank wall from the high temperatures experienced. The ranking of three assigned to the tanks that were allowed to boil indicates that the stresses on the tanks were extreme but that the risk of them being damaged in a seismic event is not as great as the tanks with a crack in them already (those tanks are assigned a rank of four).

The seventh (7) column, **heat const**, accounts for the waste constituents put into the tank that are significant in the amount of heat generated. A search was made of the historical data of the waste inventories of the tanks. Some waste is known to be hotter than most. A value ranking of one was added for **each** constituent known to have been added to a tank. The rankings indicate the importance of the waste constituents and their effect on the stress to the tank walls. Current tank waste temperatures are not chosen for this column because the heat has decreased over the years. The constituents added to the tanks over the years give an indication of the history of the stresses and potential degradation to the tank walls due to the internal waste temperature. Symbols include:

Aging: aging waste
 B: B-Plant high level waste
 P: PUREX high level waste
 PNF: Partial neutralized waste
 IC: First cycle waste
 IWW: PUREX #1 acid concentrator waste

The eighth (8) column **Interim Stabilization** accounts for the fact that many SSTs have had the majority of the supernate and interstitial fluid pumped out of them. An 'IS' in this column indicates the tank has been interim stabilized. This process includes pumping most of the liquid out of the tank so that the tank has less than 50,000 gallons of drainable interstitial liquid and less than 5,000 gallons of supernate liquid. The less liquid in the tank, the less that can flow out if the tank wall is damaged. Interim stabilization is considered when totaling the tank ranking in column ten.

Column nine (9), **Tank age**, is a ranking to account for the age of the tank. The older the tank, the greater the probability of a seismic event causing structural damage. The higher ranking accounts for the increased risk of aging on the tank liners and walls. The rankings are as follows:

- +2 - the tank was built in the 1940s or 1950s, it is 40-50 years old,
- +1 - the tank was built in the 1960s or 1970s, it is 20-30 years old,
- 0 - the tank was built since 1980.

To calculate the total risk indicator shown in column ten (10), a sum was made of the factors, or rankings, assigned in columns 2-9. For the tanks that are assigned to a watchlist, this sum was multiplied by 1.25 to account for the higher risk of the waste in these tanks. The total risk factor for the tanks that have been interim stabilized has been multiplied by 0.5 to account for the lower risk of a tank with a minimum of liquid inventory. Interim stabilization removes the great majority of the liquid in a tank. The tank

inventory is pumped down to <5,000 gallons of supernate and <50,000 gallons of drainable interstitial liquid. Dividing the total risk indicator by two (multiplying by 0.5) shows the importance of the decreased risk due to the pumping of the liquid out of the tank. The factors in this column are in the range of 1 (the lowest risk) to 22.5 (the highest risk). This risk indicator was then used to rank the individual tanks in Table 7-1.

The following four columns are for information concerning the potential and actual inventory in each of the tanks. Column eleven (11) is the full tank volume capacity of each waste tank, column twelve (12) is the actual total inventory of the tank. Columns thirteen and fourteen show the amount of liquids and solids in each of the waste tanks.

The following table is a list of the tanks and their rankings from Table A-1:

Table 7-1. Tank Rankings

Rank Total	Waste Tank
22	SX-104
17	A-101, AX-101, SX-102, SX-105
15	SX-101, SX-106, SY-101
14	AY-101
13	S-111, S-112, SX-103, U-103, U-109, SY-103
12	S-102, T-110, T-111, U-105, U-107, U-108, AW-101, AY-102, AZ-101, AZ-102, SY-102
11	BY-106, C-106, S-101, AN-103, AN-104, AN-105
10	BY-105, U-111, AW-104
9	SX-109, AN-102, AN-107, AP-101, AP-102, AP-105
8	AW-103, AW-105, AW-106
7	A-104, A-105, AX-103, C-103, S-106, S-109, T-104, AN-101, AP-106
6	A-103, B-105, B-110, SX-107, TX-05, U-102, U-110, AW-102
5	AX-102, AX-104, B-103, B-111, B-201, B-203, B-204, BY-103, S-103, S-107, SX-111, SX-114, TX-110, TX-113, TX-114, TX-115, TX-116, TX-117, U-106, AP-103, AP-104, AP-107, AP-108
4	A-106, B-104, B-107, B-112, BX-102, BX-110, BX-111, BY-107, BY-108, C-101, C-104, C-110, C-111, S-104, SX-108, SX-110, SX-112, SX-113, SX-115, T101, T-107, T-109, TY-101, TY-103, TY-104, TY-105, U-104

3	A-102, B-104, B-202, BX-101, BX-107, BX-108, BY-101, BY-104, BY-109, BY-110, BY-111, C-102, C-201, C-202, C-203, C-204, S-105, S-108, S-110, T-103, T-105, T-106, T-108, T-201, T-203, T-204, TX-101, TX-106, TX-107, TX-112, TX-118, TY-106, U-101, U-112
2	B-106, B-108, B-109, BX-103, BX-104, BX-109, BX-112, BY-102, BY-112, C-105, C-107, C-108, C-109, C-112, T-12, T-202, TX-102, TX-103, TX-108, TX-109, TX-111, U-201, U-202
1	B-102, BX-105, BX-106, T-102, TX-104, TY-102, U-203, U-204

7.2 Tank Farm Priorities

Table A-1 includes the structural inspection priority ranking for each of the 177 high level waste tanks following a natural phenomena event. The individual rankings are important to determine which tanks have the highest risk in case of a loss of cooling or confinement of its hazardous waste inventory. However, it may not be practical for the inspection team to be entering and leaving several tank farms in order to inspect the high priority tanks first. The tank farms then, have also been ranked and listed in Table B-1, according to the average tank risk priorities discovered in this analysis. This list was determined by summing the **total risk indicators** from Table A-1 for all of the tanks in each tank farm, and dividing by the number of tanks in the farm, to give an average risk indicator for the farm.

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APPENDIX A

List of Priorities for Structural Inspections

Table A-1. Individual Tank Rankings According to Risk Following a Natural Phenomena Event

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B,P,PNF,1C LMW,Aging	8 Inter Stabilized	9 Tank Age	10 Total risk indicator (X 1-25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supernatant (Kgal)	14 Solids (Kgal)	15 Comments
SINGLE-SHELL TANKS														
A-101	4	4	X	no	boil	B	-	+2	17.5 (14X)	1000	953	0	953	Tank is on the flammable gas and organics watchlist
A-102	-	0	-	no	boil	B	IS	+2	3 (.5)6	1000	41	4	37	Tank is interim stabilized
A-103	-	2	-	Leak	boil	B,P	IS	+2	6.5 (.5)13	1000	371	5	366	Tank is interim stabilized
A-104	4	0	-	Leak	boil	B,P	IS	+2	7.5 (.5)15	1000	28	0	28	Tank is interim stabilized
A-105	4	0	-	Leak	boil	P	IS	+2	7 (.5)14	1000	19	0	19	Tank is interim stabilized
A-106	-	2	-	no	boil	B,P	IS	+2	4.5 (.5)9	1000	125	0	125	Tank is interim stabilized
AX-101	4	4	X	no	boil	B,P	-	+1	17.5 (14X)	1000	748	0	748	Tank is on the flammable gas watchlist
AX-102	0	0	X	Leak	boil	B,P	IS	+1	5 (.5)10X	1000	39	3	36	Tank is interim stabilized Tank is on the organics watchlist
AX-103	4	2	X	no	boil	B,P	IS	+1	7.5 (.5)12X	1000	112	0	112	Tank is interim stabilized Tank is on the flammable gas watchlist

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B,P,PWF,1C LM,Aging	8 Inter Strabi lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern are (Kgal)	14 Solids (Kgal)	15 Comments
AX-104	-	0	-	leak	boil	B,P	IS	+1	5 (.5)10	1000	7	0	7	Tank is interim stabilized
B-101	-	2	-	leak	no	B	IS	+2	4.5 (.5)9	530	113	0	113	Tank is interim stabilized
B-102	-	0	-	no	-	-	IS	+2	1 (.5)2	530	32	4	28	Tank is interim stabilized
B-103	0	2	X	leak	-	-	IS	+2	5 (.5)8X	530	59	0	59	Tank is interim stabilized Tank is on the organics watchlist
B-104	-	4	-	no	-	1C	IS	+2	3.5 (.5)7	530	371	1	370	Tank is interim stabilized
B-105	-	4	-	leak	-	1C	IS	+2	6.88 (.5)11X	530	306	0	306	Tank is interim stabilized
B-106	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	117	1	116	Tank is interim stabilized
B-107	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	165	1	164	Tank is interim stabilized
B-108	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	94	0	94	Tank is interim stabilized
B-109	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	127	0	127	Tank is interim stabilized
B-110	-	2	-	leak	-	B,P,1C	IS	+2	6.5 (.5)11	530	246	1	245	Tank is interim stabilized
B-111	-	2	-	leak	-	P,1C	IS	+2	5 (.5)10	530	237	1	236	Tank is interim stabilized
B-112	-	0	-	leak	-	P,1C	IS	+2	4 (.5)8	530	33	3	30	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- con- trate	7 Heat Const B,P,PNF,1C iWW,Aging	8 Inter Stabi lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern ate (Kgal)	14 Solids (Kgal)	15 Comments
B- 201	-	4	-	leak	-	-	IS	+2	5 (.5)10	55	29	1	28	Tank is interim stabilized
B- 202	-	4	-	no	-	-	IS	+2	3 (.5)6	55	27	0	27	Tank is interim stabilized
B- 203	-	4	-	leak	-	-	IS	+2	5 (.5)10	55	51	1	50	Tank is interim stabilized
B- 204	-	4	-	leak	-	-	IS	+2	5 (.5)10	55	50	1	49	Tank is interim stabilized
BX- 101	-	0	-	leak	-	-	IS	+2	3 (.5)6	530	43	1	42	Tank is interim stabilized
BX- 102	-	2	-	leak	-	-	IS	+2	4 (.5)8	530	96	0	96	Tank is interim stabilized
BX- 103	-	2	-	no	-	P	IS	+2	2.5 (.5)5	530	68	6	62	Tank is interim stabilized
BX- 104	-	2	-	no	-	-	IS	+2	2 (.5)4	530	99	3	96	Tank is interim stabilized
BX- 105	-	0	-	no	-	-	IS	+2	1 (.5)2	530	51	5	46	Tank is interim stabilized
BX- 106	-	0	-	no	-	-	IS	+2	1 (.5)2	530	38	0	38	Tank is interim stabilized
BX- 107	-	4	-	no	-	1C	IS	+2	3.5 (.5)7	530	345	1	344	Tank is interim stabilized
BX- 108	-	0	-	leak	-	-	IS	+2	3 (.5)6	530	26	0	26	Tank is interim stabilized
BX- 109	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	193	0	193	Tank is interim stabilized
BX- 110	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	207	3	204	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- con- cen- trate	7 Heat Const B.P,MF,1C LMW,Aging	8 Inter Stabi- lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Total Volume (Kgal)	12 Total Waste (Kgal)	13 Supern ate (Kgal)	14 Solids (Kgal)	15 Comments
BX-111	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	162	1	161	Tank is interim stabilized
BX-112	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	165	1	164	Tank is interim stabilized
BY-101	-	4	-	no	-	-	IS	+2	3 (.5)6	758	387	0	387	Tank is interim stabilized
BY-102	-	2	-	no	-	-	IS	+2	2 (.5)4	758	277	0	277	Tank is interim stabilized
BY-103	0	4	-	leak	-	P	IS	+2	5.5 (.5)11	758	400	0	400	Tank is interim stabilized
BY-104	-	4	-	no	-	-	IS	+2	3 (.5)6	758	406	0	406	Tank is interim stabilized
BY-105	0	4	-	leak	-	-	-	+2	10	758	503	0	503	
BY-106	0	4	-	leak	-	1C	-	+2	11	758	642	0	642	
BY-107	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	758	266	0	266	Tank is interim stabilized
BY-108	-	2	-	leak	-	-	IS	+2	4 (.5)8	758	228	0	228	Tank is interim stabilized
BY-109	0	4	-	no	-	1C	-	+2	3.5 (.5)7	758	423	0	423	
BY-110	-	4	-	no	-	1C	IS	+2	3.5 (.5)7	758	398	0	398	Tank is interim stabilized
BY-111	-	4	-	no	-	-	IS	+2	3 (.5)6	758	459	0	459	Tank is interim stabilized
BY-112	-	2	-	no	-	-	IS	+2	2 (.5)4	758	291	0	291	Tank is interim stabilized
C-101	-	2	-	leak	-	P	IS	+2	4.5 (.5)9	530	88	0	88	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B,P,PNF,1C 1WW,Aging	8 Inter Stabi lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern ate (Kgal)	14 Solids (Kgal)	15 Comments
C-102	-	4	X	no	-	-	IS	+2	3.75 (.5)6X	530	316	0	316	Tank is interim stabilized Tank is on the organics watchlist
C-103	0	2	X	no	-	B,P	-	+2	7.5 6X	530	195	133	62	Tank is on the organics watchlist
C-104	-	4	-	no	-	B,P,1WW	IS	+2	4.5 (.5)9	530	295	0	295	Tank is interim stabilized
C-105	0	2	-	no	-	P	IS	+2	2.5 (.5)5	530	134	2	132	
C-106	4	2	X	no	-	P	-	+2	11.3 9X	530	229	32	197	Tank is on the high heat load watchlist
C-107	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	237	0	237	Tank is interim stabilized
C-108	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	66	0	66	Tank is interim stabilized
C-109	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	66	4	62	Tank is interim stabilized
C-110	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	178	1	177	Tank is interim stabilized
C-111	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	57	0	57	Tank is interim stabilized
C-112	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	530	104	0	104	Tank is interim stabilized
C-201	-	0	-	leak	-	-	IS	+2	3 (.5)6	55	2	0	2	Tank is interim stabilized
C-202	-	0	-	leak	-	-	IS	+2	3 (.5)6	55	1	0	1	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B.P, PNF, 1C 1W, Aging	8 Inter Stabi- lized	9 Tank Age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern ate (Kgal)	14 Solids (Kgal)	15 Comments
C-203	-	0	-	Leak	-	-	IS	+2	3 (.5)6	55	5	0	5	Tank is interim stabilized
C-204	-	0	-	Leak	-	-	IS	+2	3 (.5)6	55	3	0	3	Tank is interim stabilized
S-101	0	4	-	no	boil	B,PNF	-	+2	11	758	427	12	415	
S-102	4	4	X	no	-	-	-	+2	12.5 10X	758	549	0	549	Tank is on the flammable gas and organics watchlist
S-103	0	2	-	no	-	PNF	-	+2	5	758	248	17	231	
S-104	-	2	-	Leak	-	PNF	IS	+2	4.5 (.5)9	758	294	1	293	Tank is interim stabilized
S-105	-	4	-	no	-	PNF	IS	+2	3.5 (.5)7	758	456	0	456	Tank is interim stabilized
S-106	0	4	-	no	-	PNF	-	+2	7	758	479	4	475	
S-107	0	2	-	no	-	PNF	-	+2	5	758	376	14	362	
S-108	0	4	-	no	-	PNF	IS	+2	3.5 (.5)7	758	604	0	604	
S-109	0	4	-	no	-	PNF	-	+2	7	758	568	0	568	
S-110	0	4	-	no	-	PNF	IS	+2	3.5 (.5)7	758	390	0	390	
S-111	4	4	X	no	-	PNF	-	+2	13.8 11X	758	596	10	586	Tank is on the flammable gas and organics watchlist

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B,P,PNF,IC ,IM,Agng	8 Inter Stabi lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern ate (Kgal)	14 Solids (Kgal)	15 Comments
S- 112	4	4	X	no	-	PNF	-	+2	13.8 11X	758	523	0	523	Tank is on the flammable gas watchlist
SX- 101	4	2	X	no	boil	PNF	-	+2	15 12X	1000	456	1	455	Tank is on the flammable gas watchlist
SX- 102	4	4	X	no	boil	PNF	-	+2	17.5 14X	1000	543	0	543	Tank is on the flammable gas watchlist
SX- 103	4	4	X	no	-	PNF	-	+2	13.8 11X	1000	652	1	652	Tank is on the flammable gas and organics watchlist
SX- 104	4	4	X	leak	boil	PNF	-	+2	22.5 18X	1000	614	0	614	Tank is on the flammable gas watchlist
SX- 105	4	4	X	no	boil	PNF	-	+2	17.5 14X	1000	683	0	683	Tank is on the flammable gas watchlist
SX- 106	4	4	X	no	-	B,PNF	-	+2	15 12X	1000	538	61	538	Tank is on the flammable gas and organics watchlist
SX- 107	-	2	-	leak	boil	-	IS	+2	6.5 (.5)11	1000	104	0	104	Tank is interim stabilized
SX- 108	-	0	-	leak	boil	-	IS	+2	4.5 (.5)9	1000	87	0	87	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B.P.M.F. 1C /MW, Aging	8 Inter- Strabi- lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (kgal)	12 Total Waste (kgal)	13 Supernatant (kgal)	14 Solids (kgal)	15 Comments
SX-109	4	2	X	Leak	boil	-	IS	+2	9.38 (.5)15X	1000	244	0	244	Tank is interim stabilized Tank is on the flammable gas Matchlist
SX-110	-	0	-	Leak	boil	-	IS	+2	4.5 (.5)9	1000	62	0	62	Tank is interim stabilized
SX-111	-	2	-	Leak	boil	-	IS	+2	5.5 (.5)11	1000	125	0	125	Tank is interim stabilized
SX-112	-	0	-	Leak	boil	-	IS	+2	4.5 (.5)9	1000	92	0	92	Tank is interim stabilized
SX-113	-	0	-	Leak	boil	-	IS	+2	4.5 (.5)9	1000	26	0	26	Tank is interim stabilized
SX-114	-	2	-	Leak	boil	-	IS	+2	5.5 (.5)11	1000	181	0	181	Tank is interim stabilized
SX-115	-	0	-	Leak	boil	-	IS	+2	4.5 (.5)9	1000	12	0	12	Tank is interim stabilized
T-101	-	2	-	Leak	-	1C	IS	+2	4.5 (.5)9	530	102	1	101	Tank is interim stabilized
T-102	-	0	-	no	-	-	IS	+2	1 (.5)2	530	32	13	19	Tank is interim stabilized
T-103	-	0	-	Leak	-	-	IS	+2	3 (.5)6	530	27	4	23	Tank is interim stabilized
T-104	0	4	-	no	-	1C	-	+2	7	530	368	0	368	
T-105	-	4	-	no	-	1C	IS	+2	3.5 (.5)7	530	98	0	98	Tank is interim stabilized
T-106	-	0	-	Leak	-	1C	IS	+2	3.5 (.5)7	530	21	2	19	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch List tank	5 Tank Leaks	6 Self- concen- trate	7 Heat Const B.P, PNF, 1C , 1HW, Aging	8 Inter Stabi- lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Superm at (Kgal)	14 Solids (Kgal)	15 Comments
T- 107	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	173	0	173	Tank is interim stabilized
T- 108	-	0	-	leak	-	1C	IS	+2	3.5 (.5)7	530	44	0	44	Tank is interim stabilized
T- 109	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	530	58	0	58	Tank is interim stabilized
T- 110	4	4	X	no	-	-	-	+2	12.5 10X	530	379	3	376	Tank is on the flammable gas watchlist
T- 111	0	4	X	leak	-	-	IS	+2	12.5 10X	530	446	0	446	Tank is interim stabilized Tank is on the organics watchlist
T- 112	-	2	-	no	-	-	IS	+2	2 (.5)4	530	67	7	60	Tank is interim stabilized
T- 201	-	4	-	no	-	-	IS	+2	3 (.5)6	55	29	1	28	Tank is interim stabilized
T- 202	-	2	-	no	-	-	IS	+2	2 (.5)4	55	21	0	21	Tank is interim stabilized
T- 203	-	4	-	no	-	-	IS	+2	3 (.5)6	55	35	0	35	Tank is interim stabilized
T- 204	-	4	-	no	-	-	IS	+2	3 (.5)6	55	38	0	38	Tank is interim stabilized
TX- 101	-	2	-	no	-	B, 1C	IS	+2	3 (.5)6	758	87	3	84	Tank is interim stabilized
TX- 102	-	2	-	no	-	-	IS	+2	2 (.5)4	758	217	0	217	Tank is interim stabilized

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concentrate	7 Heat Const B.P., pH, TC , LW, Aging	8 Inter Stabi- lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (kgal)	12 Total Volume (kgal)	13 Super- natant (kgal)	14 Solids (kgal)	15 Comments
Tx- 103	-	2	-	no	-	-	IS	+2	2 (.5)4	758	157	0	157	Tank is interim stabilized
Tx- 104	-	0	-	no	-	-	IS	+2	1 (.5)2	758	65	1	64	Tank is interim stabilized
Tx- 105	0	4	X	Leak	-	-	IS	+2	6.25 10X	758	609	0	609	Tank is interim stabilized Tank is on the organics watchlist
Tx- 106	-	4	-	no	-	-	IS	+2	3 (.5)6	758	453	0	453	Tank is interim stabilized
Tx- 107	-	0	-	Leak	-	-	IS	+2	3 (.5)6	758	36	1	35	Tank is interim stabilized
Tx- 108	-	2	-	no	-	-	IS	+2	2 (.5)4	758	134	0	134	Tank is interim stabilized
Tx- 109	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	758	384	0	384	Tank is interim stabilized
Tx- 110	-	4	-	Leak	-	1C	IS	+2	5.5 (.5)11	758	462	0	462	Tank is interim stabilized
Tx- 111	-	2	-	no	-	1C	IS	+2	2.5 (.5)5	758	370	0	370	Tank is interim stabilized
Tx- 112	-	4	-	no	-	-	IS	+2	3 (.5)6	758	649	0	649	Tank is interim stabilized
Tx- 113	-	4	-	Leak	-	1C	IS	+2	5.5 (.5)11	758	607	0	607	Tank is interim stabilized
Tx- 114	-	4	-	Leak	-	1C	IS	+2	5.5 (.5)11	758	535	0	535	Tank is interim stabilized
Tx- 115	-	4	-	Leak	-	-	IS	+2	5 (.5)10	758	640	0	640	Tank is interim stabilized

1 Tank	2 Vent system Tank	3 Inventory Tank	4 Watch list Tank	5 Tank Leaks	6 Self- clean- ing rate	7 Heat Const B.P. PNF 1C /W/Aging	8 Enter Stabi- lized	9 Tank age	10 Total risk indicat- or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Super- nat- ant (Kgal)	14 Solids (Kgal)	15 Comments
TX- 116	-	4	-	leak	-	-	IS	+2	5 (.5)10	758	631	0	631	Tank is interim stabilized
TX- 117	-	4	-	leak	-	1C	IS	+2	5.5 (.5)11	758	626	0	626	Tank is interim stabilized
TX- 118	0	2	X	no	-	1C	IS	+2	3.13 (.5)5X	758	347	0	347	Tank is interim stabilized Tank is on the organics watchlist
TY- 101	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	758	118	0	118	Tank is interim stabilized
TY- 102	-	0	-	no	-	1C	IS	+2	1.5 (.5)3	758	64	0	64	Tank is interim stabilized
TY- 103	-	2	-	leak	-	1C	IS	+2	4.5 (.5)9	758	162	0	162	Tank is interim stabilized
TY- 104	0	0	X	leak	-	1C	IS	+2	4.38 (.5)7X	758	46	3	43	Tank is interim stabilized Tank is on the organics watchlist
TY- 105	-	2	-	leak	-	-	IS	+2	4 (.5)8	758	231	0	231	Tank is interim stabilized
TY- 106	-	0	-	leak	-	-	IS	+2	3 (.5)6	758	17	0	17	Tank is interim stabilized
U- 101	-	0	-	leak	-	-	IS	+2	3 (.5)6	550	25	3	22	Tank is interim stabilized
U- 102	-	4	-	no	-	-	-	+2	6	550	374	18	356	
U- 103	4	4	X	no	-	PNF	-	+2	13.8 11X	550	468	13	455	Tank is on the flammable gas and organics watchlist

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concen- trate	7 Heat Const B,P,PNF,1C ,IWW,Aging	8 Inter Stabi- lized	9 Tank age	10 Total risk indicat or (X 1,25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern ate (Kgal)	14 Solids (Kgal)	15 Comments
U-104	-	2	-	leak	-	-	IS	+2	4 (.5)8	530	122	0	122	Tank is interim stabilized
U-105	4	4	X	no	-	-	-	+2	12.5 10X	530	418	37	381	Tank is on the flammable gas and organics watchlist
U-106	0	2	X	no	-	-	-	+2	5 4X	530	226	15	211	Tank is on the organics watchlist
U-107	4	4	X	no	-	-	-	+2	12.5 10X	530	406	31	375	Tank is on the flammable gas and organics watchlist
U-108	4	4	X	no	-	-	-	+2	12.5 10X	530	468	24	444	Tank is on the flammable gas watchlist
U-109	4	4	X	no	-	PNF	-	+2	13.8 11X	530	463	19	444	Tank is on the flammable gas watchlist
U-110	-	2	-	leak	boil	1C	IS	+2	6 (.5)12	530	186	0	186	Tank is interim stabilized
U-111	0	4	X	no	-	PNF,1C	-	+2	10 8X	530	329	0	329	Tank is on the organics watchlist
U-112	-	0	-	leak	-	1C	IS	+2	3.5 (.5)7	530	49	4	45	Tank is interim stabilized
U-201	-	2	-	no	-	-	IS	+2	2 (.5)4	55	5	1	4	Tank is interim stabilized
U-202	-	2	-	no	-	-	IS	+2	2 (.5)4	55	5	1	4	Tank is interim stabilized

1 Tank	2 Vent system tank	3 Inventory tank	4 Watch list tank	5 Tank Leaks	6 Self- con- centrate	7 Heat Const B, P, W, T, C Flow, Aging	8 Inter- stabi- lized	9 Tank age	10 Total residual indicat or (X 1.25)	11 Tank Volume (kgal)	12 Total Water (kgal)	13 Super- natant (kgal)	14 Solids (kgal)	15 Comments
U- 203	0	0	X	no	-	-	IS	+2	1.25 (.5)2X	55	3	1	2	Tank is interim stabilized Tank is on the organics watchlist
U- 204	0	0	X	no	-	-	IS	+2	1.25 (.5)2	55	3	1	2	Tank is interim stabilized Tank is on the organics watchlist
DOUBLE-SHELL TANKS														
AN- 101	5	2	-	no	-	-	-	0	7	1160	116	83	33	
AN- 102	5	4	-	no	-	-	-	0	9	1160	1079	990	89	
AN- 103	5	4	X	no	-	-	-	0	11.3 9X	1160	956	19	937	Tank is on the flammable gas watchlist
AN- 104	5	4	X	no	-	-	-	0	11.3 9X	1160	1055	791	264	Tank is on the flammable gas watchlist
AN- 105	5	4	X	no	-	-	-	0	11.3 9X	1160	1128	1128	0	Tank is on the flammable gas watchlist
AN- 106	5	2	-	no	-	-	-	0	7	1160	416	399	17	
AN- 107	5	4	-	no	-	-	-	0	9	1160	1056	809	247	
AP- 101	5	4	-	no	-	-	-	0	9	1160	1043	1043	0	
AP- 102	5	4	-	no	-	-	-	0	9	1160	1097	1097	0	

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concen- trate	7 Heat Const B,P,PNF,1C ,IWW,Aging	8 Inter Stabi- lized	9 Tank age	10 Total risk indicat or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern- ate (Kgal)	14 Solids (Kgal)	15 Comments
AP-103	5	0	-	no	-	-	-	0	5	1160	23	22	1	
AP-104	5	0	-	no	-	-	-	0	5	1160	26	26	0	
AP-105	5	4	-	no	-	-	-	0	9	1160	1123	969	154	
AP-106	5	2	-	no	-	-	-	0	7	1160	262	262	0	
AP-107	5	0	-	no	-	-	-	0	5	1160	21	21	0	
AP-108	5	0	-	no	-	-	-	0	5	1160	46	46	0	
AW-101	5	4	X	no	-	-	-	+1	12.5 10X	1160	1128	1044	84	Tank is on the flammable gas watchlist
AW-102	5	0	-	no	-	-	-	+1	6	1160	99	63	36	
AW-103	5	2	-	no	-	-	-	+1	8	1160	514	151	363	
AW-104	5	4	-	no	-	-	-	+1	10	1160	1121	831	290	
AW-105	5	2	-	no	-	-	-	+1	8	1160	440	160	280	
AW-106	5	2	-	no	-	-	-	+1	8	1160	321	96	225	
AY-101	5	4	-	no	-	B,P2, Aging	-	+2	14	1000	918	824	94	
AY-102	5	4	-	no	-	Aging	-	+2	12	1000	841	811	30	
AZ-101	5	4	-	no	-	Aging, P3	-	+1	12	1000	870	835	35	
AZ-102	5	4	-	no	-	Aging, P3	-	+1	12	1000	922	827	95	

1 Tank	2 Vent system rank	3 Inventory rank	4 Watch list tank	5 Tank Leaks	6 Self- concen- trate	7 Heat Const 8,P,PNF,1C ,iWW,Aging	8 Inter Stabi- lized	9 Tank age	10 Total risk indicat- or (X 1.25)	11 Tank Volume (Kgal)	12 Total Waste (Kgal)	13 Supern- ate (Kgal)	14 Solids (Kgal)	15 Comments
SY- 101	5	4	X	no	-	PNF	-	+2	15 12X	1160	1114	1073	41	Tank is on the flammable gas watchlist
SY- 102	5	4	-	no	-	PNF	-	+2	12	1160	610	539	71	
SY- 103	5	4	X	no	-	-	-	+2	13.8 11X	1160	748	382	366	Tank is on the flammable gas watchlist

Key for Table A-1

- (2) a. A dash (-) in the **vent system rank** column indicates that the tank is 'interim stabilized' and not a watch-list tank, so the vent system status is not a great concern.
- b. A zero (0) in the **vent system rank** column indicates that the tank is a watch-list tank but it is not on the flammable gas watchlist, so the vent system status is not a great concern.
- c. A four (4) in the **vent system rank** column indicates that the tank has a passive breathing system and it is on the watch list for flammable gas buildup.
- d. A five (5) in the **vent system rank** column indicates that the tank normally has an operating, active ventilation system, and that the system should be returned to service as soon as possible, if shutdown due to a natural phenomena event, to maintain cooling and confinement.
- (3) The inventory ranking is based on the following waste volumes:
 Rank 4 = ≥50% tank full
 Rank 2 = 10-49.9% tank full
 Rank 0 = <10% tank full
- (4) An 'X' in this column indicates the tank is on a watch list.
- (5) **Tank leaks:** Tank is a known leaker.
- (6) **Self-concentrator:** the tanks indicating 'boil' were allowed to boil as a means of cooling, this only includes SSTs.
- (7) **Heat Const.:** this column indicates that waste constituents that were very hot thermally were put into this tank. Symbols include:
 Aging: aging waste
 B: B-Plant high level waste
 P: PUREX high level waste
 PNF: Partial neutralized waste
 IC: First cycle waste
 IWW: PUREX #1 acid concentrator waste
- (8) **Interim Stabilization:** An 'IS' in this column indicates the tank has been interim stabilized. This process includes pumping most of the liquid out of the tank so that the tank has less than 50,000 gallons of drainable interstitial liquid and less than 5,000 gallons of supernate liquid.
- (9) **Tank age:** a ranking was assigned to each tank according to its age, as follows:
 +2 - the tank was built in the 1940s or 1950s, it is 40-50 years old,
 +1 - the tank was built in the 1960s or 1970s, it is 20-30 years old,
 0 - the tank was built since 1980.

- (10) The **total risk indicator** column is a sum of the values in columns 3-8. The 'X' in column 5 indicates the tank is on a watchlist. These values include a multiplier of 1.25 to account for the watchlist concerns. The 'IS' in column 9 indicates the tank has been interim stabilized, the **risk indicator** for these tanks has been multiplied by 0.5 to show the decreased safety risk due to the interim stabilization efforts.
- (11) - (14) Inventory of the tank:
- (11) Tank total volume, design capacity
 - (12) Total waste volume in the tank, liquids and solids
 - (13) Supernate (liquids) volume in the tank
 - (14) Solids volume in the tank

APPENDIX B

Tank Farm Structural Inspection Priority

Table B-1. Tank Farm Structural Inspection Priority

PRIORITY	TANK FARM	TANK FARM TOTAL RISK INDICATORS	NUMBER OF TANKS IN FARM	AVERAGE TOTAL RISK INDICATOR
1	SY	40.8	3	13.6
2	AY	26	2	13.0
3	AZ	24	2	12.0
4	SX	151	15	10.0
5	AN	65.9	7	9.41
6	AW	52.5	6	8.75
7	AX	35	4	8.75
8	A	46	6	7.67
9	S	90.1	12	7.51
10	U	109	16	6.82
11	AP	54	8	6.75
12	BY	55	12	4.58
13	T	73	16	4.56
14	B	66.4	16	4.15
15	C	65.1	16	4.07
16	TY	21.9	6	3.65
17	TX	65.4	18	3.63
18	BX	34	12	2.83

CHECKLIST FOR PEER REVIEW

Document Reviewed: HNF-SD-WM-CN-105, Rev. 0, Post Natural Phenomena Event
Priorities For Structural Investigations In The Tank Farms

Scope of Review: reviewed report but did not verify references

Yes	No	NA	
☐	☐	☒	* Previous reviews complete and cover analysis, up to scope of this review, with no gaps.
☒	☐	☐	Problem completely defined.
☐	☐	☒	Accident scenarios developed in a clear and logical manner.
☒	☐	☐	Necessary assumptions explicitly stated and supported.
☐	☐	☒	Computer codes and data files documented.
☐	☐	☒	Data used in calculations explicitly stated in document.
☐	☐	☒	Data checked for consistency with original source information as applicable.
☐	☐	☒	Mathematical derivations checked including dimensional consistency of results.
☐	☐	☒	Models appropriate and used within range of validity or use outside range of established validity justified.
☒	☐	☐	Hand calculations checked for errors. Spreadsheet results should be treated exactly the same as hand calculations.
☐	☐	☒	Software input correct and consistent with document reviewed.
☐	☐	☒	Software output consistent with input and with results reported in document reviewed.
☒	☐	☐	Limits/criteria/guidelines applied to analysis results are appropriate and referenced. Limits/criteria/guidelines checked against references.
☒	☐	☐	Safety margins consistent with good engineering practices.
☒	☐	☐	Conclusions consistent with analytical results and applicable limits.
☒	☐	☐	Results and conclusions address all points required in the problem statement.
☒	☐	☐	Format consistent with appropriate NRC Regulatory Guide or other standards
☐	☐	☒	* Review calculations, comments, and/or notes are attached.
☒	☐	☐	Document approved.

John E. Kelly

05/05/97

Reviewer (Printed Name and Signature)

Date

* Any calculations, comments, or notes generated as part of this review should be signed, dated and attached to this checklist. Such material should be labeled and recorded in such a manner as to be intelligible to a technically qualified third party.