From: "Bode, Paul M." <PBode@entergy.com>
To: "Cox, Mark R" <mcox90@entergy.com>, "Long, Christopher" <clong91@entergy.com>, "'James Noggle'" <JDN@nrc.gov>
Date: 2/10/06 9:16PM
Subject: FW: Report to NRC

I just realized I had not sent this before I left.

Enjoy the weekend.

From: Bode, Paul M.
Sent: Friday, February 10, 2006 3:19 PM
To: Hinrichs, Gary; Axelson, William L; Lavera, Ron; English, Christopher; Peters, James; Croulet, Donald
Subject: Report to NRC

Gary, Bill, Ron, Chris, Jim and Don;

Here is what we provided to Mark Cox and Chris Long today. You are on CC for this.

The letter summarizes that the KT-PA ported out to FMA-based trouble-shooting effort that is currently underway on site.

We provided the "Troubleshooting Strategy and Action - Tritium in the Groundwater" plan which coalesced existing thoughts and actions into a concise document to facilitate planning and communicating to stakeholders. A lot of these actions were already in place but the CAs and the schedule may not have done a good job of communicating them to stakeholders. The team needs to look this over and refine it and use it to guide actions and communicate the bases for action.

The document consists of two elements; the governing strategy, and a FMA-based approach to finding the source.

The strategy currently defines four areas. That is followed by the objectives and actions for each area. A given strategy area may have multiple objectives, and each objective may have multiple actions. An example of how to use it is to recognize that the tracer test may have objectives tied to locating the source, not just to validate the hydrology, so the strategy may help you recognize the need make sure actions to identify sources (lines, tank, sumps and spills) are complete before you meet with GZA. For each objective of each strategy, ask yourself two questions; (1)what could prevent us from achieving this objective, and (2) how can we capitalize on this to its fullest extent for trouble-shooting purposes. Then take actions to achieve the objective, to prevent the obstacle from becoming a reality, and to capitalize on your actions.

The strategy is followed by the FMA-based approach to finding the source. Each SSC has two trouble-shooting modes. A common-mode tied to site hydrology and geology testing, and an SSC-specific mode where each SSC should be brainstormed to figure out all the things you can do to test it as a source. Again, this is already under way but this tool now allows you to better communicate the completeness of that effort. Please look it over and make sure you are using all opportunities and techniques that time and resources allow for expediting resolution.

Both elements of the strategy and plan focus on documentation. We also established the expectation that milestone documents be captured in the CA system. The 'R' drive is a good repository for the ongoing data collection. However, key milestone documents, like technical positions on the source of the water coming from the wall, or reports from GZA, need to be formalized, signed and put into the system for future use. This will facilitate future any cause-analysis efforts.

While I can be contacted for any questions you may have on the activities covered by this report, the

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discussed actions identified herein are being managed by Gary Hinrichs. He should be contact for any future action required.

Thank you.

Paul B.

<<Response_final.doc>> <<from_axeslon.doc>>

Memorandum To: Don Mayer
From: Paul Bode
Subject: Status of Problem-Solving Actions to Resolve the Tritium in the Groundwater concern.
Date: 2/8/2006

The memo serves to clarify the understanding of the Kepner-Tregoe Problem Analysis (KT-PA) process as applied to the tritium situation at IPEC, and the actions that were driven by that effort. The initial application of KT-PA is complete for both leak rate and groundwater tritium, and has driven actions that are currently captured in the CR system, and the project schedule and the ER Requests. You are currently in the trouble-shooting phase of this process of determining the source of tritium in the ground water and the SFP leak investigation. As indicated by the attached diagram (Attachment #1), at some point in the future you may elect to initiate another instance of KT-PA, at your discretion. Other tools for problem analysis are also available.

The organization asked for support to facilitate a KT-PA session from the information available in 4th quarter of 2005. The organization assembled a team consisting of staff from RP, Chemistry, Licensing, and Engineering, with responsibilities that cover all three station units. At that time there was much debate as to the nature of the water leaking from the Unit 2 SFP concrete wall as well as where the tritium in the ground water was coming from. As part of the site's response to finding a leak in the wall of the U2 SFP concrete wall, the site sampled existing wells and storm drains and found elevated tritium in the transformer yard wells. This indicated that the site had a broader issue and prompted the project manager at the time to ask for support to help separate and clarify the concerns, and to determine if we could definitively arrive at any causal conclusion. The site could not. The concerns were separated into three broad areas, (1) technically explaining the radio-chemistry profile of the SFP water and finding its source in the liner of the U2 pool (2) ascertaining with some degree of technical confidence the specific source of tritium in the monitoring wells and the extent of it, on and off site, and (3) establishing a long-term site-monitoring program and tracer strategy regardless of the outcome of the short-term cause analysis efforts. All three concerns are being acted upon and are being tracked by the project manager on a project schedule and in PCRS.

The source of the water in the crack of the U2 SFP concrete wall is accepted to be from the U2 pool as no other source of highly borated, highly tritiated water would issue from the wall at that elevation. The ratio of the cesium isotopes in the leak gives an apparent age of 8 to 10 years old that, given the fluctuations in the pool itself, and the possibility for contamination from different periods mixing together, make it difficult to narrow down to a specific timeframe, or pool activity that may have caused a leak. The supporting data and conclusions from RP are attached in Attachment #3. Analysis of the pool and boron use and concentration indicate that if there is a leak, it is a small leak. The pool is being inspected to identify potential locations of the leak and suspicious indications will be repaired even though no leakage is identified. The crack itself is contained and monitored.

The tritium in the ground water is effectively being monitored through existing means and new wells that are being installed to fully characterize the groundwater contamination. Efforts are underway to identify and eliminate specific source(s), both above and below ground. These actions are captured in the corrective action process. Attachment #2, "Troubleshooting Strategy and Action – Tritium in the Groundwater" has been developed to help concisely and efficiently communicate that effort and to ensure going forward investigation tasks appropriately consider other potential extent of condition actions. This helps assure the quality of that analysis to ensure all opportunities to determine the source and cause are documented and acted upon.

The Radiation Protection group and Chemistry have been actively pursuing the development of a long-term site monitoring program. This has been coordinated with the hydrologists to ensure well placement supports the ability to characterize and monitor the site and potential release pathways.

Typically, at the conclusion of any trouble-shooting process, the problem-analysis team is re-convened to ensure that any causal conclusions that were drawn are valid and can be validated through an accountable, technically documented manner. The site team is collecting and storing all its documented information and data on a shared network drive on site and this data is not reproduced in this report or the KT-PA process. The site sends out routine updates of this information via email.

The purpose of the requested application of KT-PA has been achieved. The site is acting systematically to resolve the situation. This is the consensus of the team and the project manager.

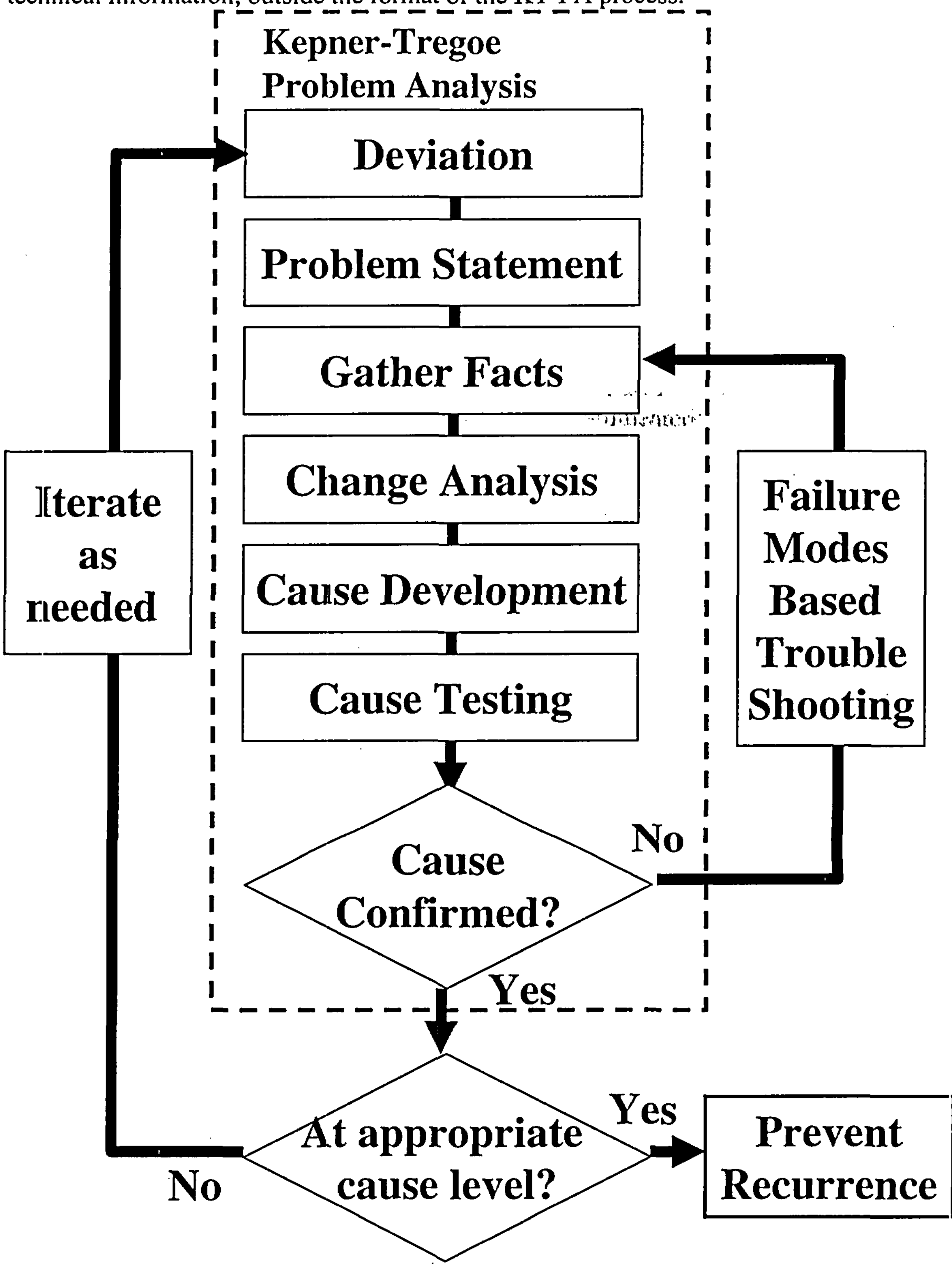
Regards,

Paul Bode

Attachment #1 - KT-PA flow diagram.
Attachment #2 - Troubleshooting Strategy and Action – Tritium in the Groundwater.
(Attachments 1 and 2 are included in the electronic document. Others are separate.)
Attachment #3 – Source and Age of U2 SFP Concrete Wall Crack Water
Attachment #4 – IPEC Plan Showing Underground Radioactive Pipes
Attachment #5 – Rationale for Well Placement

CC: Gary Hinrichs
Bill Axelson
Ron Lavera
Chris English
Jim Peters
Don Croulet

Attachment 1: KT-PA flow diagram.
Conceptual model the role KT-PA may play in cause analysis. The site is currently in the Failure Modes Based Trouble Shooting Process. It elected to use the 'R' drive to update technical information, outside the format of the KT-PA process.



Strategy and Summary

Each possible source of tritium has two broad areas for actions; there is a source-specific approach, and a common-mode using the wells, tracers and storm drains. The source-specific mode is addressed in the failure modes analysis table following this strategy. The common mode is based on understanding the site hydrology, and using all available sampling point opportunities to understand where we have tritium and how it is moving, so we can better understand where it comes from, and the impact on the environment and the public. The following table summarizes the strategy. It serves to guide actions and to inform stakeholders. Actions are captured in the corrective action program or are tracked in the failure modes analysis table or project plan.

The strategy consists of working in four strategic areas;

1. If a Structure System or Component (SSC) leaks, how will it move on site?
2. Where do we have tritium in the ground?
3. What is/are the likely source(s) of tritium that could contaminate the ground?
4. How will we monitor this situation in the future?

Reports or conclusion that are integral to the strategy and plan are or will be captured in the PCRS CA system for accountability and retrievability purposes.

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

	Strategy Area	Objective	Supporting Actions	Comments/Documented	Owner	Due
1	How does groundwater move on site?	Characterize site hydrology using existing site studies, site building construction information, wells and storm drains.	Develop strategy and objectives for well placement. Support the following four objectives: 1. Define the tritium plume isopleths. 2. Determine tritium flow direction and rate. 3. Determine if the plume can impact personnel health and safety offsite in the groundwater pathway. 4. Monitor for potential future U2 SFP leaks or other leaks on site.	Memorandum on Potential Fate and Transport of Possible Leakage from IP2 SFP. November, 2005 (CA ??) GZA Interim Phase 1 Report. Jan 26, 2006 (CR-3986- CA-00029)	Axelson/GZA	
			Identify where to place additional wells based on this result.	ER-05-2-113	Hinrichs	
			Place the wells.	WO-IP2-06-11791	Hinrichs	

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

	Strategy Area	Objective	Supporting Actions	Comments/Documented	Owner	Due
			Ensure support U2 FSB work.	Caused the development of a 2-Phase approach. Phase 1 – Characterize the U2 SFP as a compensatory measure for the future, given no tell-tale system Phase 2 – Characterize the site and perimeter for current	Hinrichs	
		Validate hydrology and geology model using existing and new wells	Develop a 3-D conceptual model of the site.	To be developed GZA.	Hinrichs	
2	Where do we have tritium in the ground?	Characterize the isopleths, its direction and flow rate.	Drilling wells	GZA to determine direction and flow-rate in final report.	Hinrichs/GZA	
			Sampling Wells Weekly		Axelson	
		Communicate to stakeholders.	Trending the data		Mayer	On-going
3	What is/are the likely source(s) of tritium that could contaminate the ground?	Eliminate sources which may be contributing to the identified ground-water contamination.	Develop a list of sources above and below ground.			
			Integrate these sources with our site tracer strategy.			

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

	Strategy Area	Objective	Supporting Actions	Comments/Documented	Owner	Due
			Prioritize inspection, testing and tracing efforts to identify and effect repair or eliminate sources.			
4	How will we monitor this situation in the future?	Make sure we can effectively monitor site ground-water tritium levels in the future.	Develop Long-term Monitor Plan.			
		Ensure we are protecting the public health and safety and the environment.	Develop trigger points for each well to initiate decision-making process on remedial actions.			

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

The following tree and table looks at the possible sources of tritium. The tree groups these by broad areas to facilitate planning, tracking and review purposes. The following table tracks, on an individual SSC basis, what actions will or have been taken to either identify it as the source or to eliminate it as the source.

Problem Statement:
Tritium in onsite ground water.

Failure Mode 1:
Lines/Pipes.
Above and below ground

- U1 Waste Transfer Line
- U2 RWST Line
- U3 to U2 underground waste line - abandoned
- U3 to U2 Blowdown Transfer Line
- 6" drain to MH-5 U2 VC foundation drain.
- 4" drain under fan house
- 4' contaminated drain line routed under MOB to WHT Pit
- 4" drain line routed under WHT Pit slab
- 12" line 181 from RWST to PAB U2
- 16" line 155 from RWST to PAB U2
- 6" line 299 from WHT Sump Pit to RWST
- 8" drain from Unit 1 FSB to storm drain
- Unit 1 foundation drain
- CSB foundation drain
- 6" line 252 from RWST
- 12" line 181 from RWST to PAB U3
- 16" line 155 from RWST to PAB U3
- 4" floor drain under WHT pit slab
- 2" PWR line from RAMS
- 4" floor drain under fan house mini containment
- 4" floor drain embedded at 15' of PAB
- 6" drain line under containment mat

Failure Mode 2:
Tanks/Pools.

- U1 West Pool
- U1 Other Pools
- U2 SFP
- U2 RWST
- U3 SFP
- U2 CVCS Tanks
- U2 Waste H/U Tanks
- U3 RWST
- U3 CVCS Tanks
- U3 Waste H/U Tanks
- U2 SFP Transfer Canal

Failure Mode 3:
Sumps Drains Basements.

- IP-2 Transformer Yard - Turbine hall condensate drainage
- U3 Operation of Main Steam supply to Auxilary Steam system.
- IP-3 41' PAB Sump Pump Dishcharge to storm drain
- U2 PAB Sump
- U2 PAB 15'
- U2 MOB
- U3 PAB Sump
- U3- Room with the rock, had pipe trench from PAB spilling into area below cable tunnel

Failure Mode 4:
Other Releases / Spills 50.75(g) records

- U2 Resin Spill in alleyway next to FSB
- U2 Blowdown atmospheric release
- U2 SG Tube Leak Feb 2000
- U3- area between VC, FSB, PAB, (aka Pigeon Pit)
- U3 Sewage septic field
- U3 SG Tube Leak Oct 1989
- U3 RWST base of Hill contaminated Water stream
- T1, T2, U3 Core Bores
- U3-1,2,3 Canal Monitoring Wells

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
1	U2 Waste Transfer Line to U1	Phase 2 Target MW-42	Physical Inspection Hydro-test	Open		Drake	
1	U2 RWST Line	Phase 2 MW-42, Storm drain	Physical Inspection Soil Samples	Open		Drake/ Axelson	
1	U3 to U1 underground waste line - abandoned	Phase 2 MW-39, 47	Physical Inspection Not needed	Open –abandon pipe/capped		English	
1	U3 to U1 Blowdown Transfer Line	Phase 2 MW-39, 47	Physical Inspection	Open		Drake	
1	6" drain to MH-5 U2 VC foundation drain	N/A	Physical Inspection	Open		Drake	
1	4" drain under fan house. U2 & U3	N/A	Physical Inspection	Open		Drake	
1	4' contaminated drain line routed under MOB to WHT Pit	N/A	W/O to remove storm drain Line	Open		Drake	
1	12" line 181 from RWST to PAB U2	Phase 2 MW-42	Physical Inspection Soil Analysis	Open		Drake/RP	

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
1	16" line 155 from RWST to PAB U2	Phase 2 MW-42	Physical Inspection Soil Analysis	Open		Drake/RP	
1	6" line 299 from WHT Sump Pit to RWST	Phase 2 Well # 32&42	Physical Inspection	Open		Drake	
1	8" drain fro Unit 1 FSB to storm drain	Phase 2 Well #42	Physical Inspection	Roof Drain CSB		English	
1	Unit 1 foundation drain	Phase 2 MW-49&37	N/A	Open		English	
1	CSB foundation drain	Phase 2 MW-39&47	Physical Inspection Tracer Test	So. Curtain Drain		English	
1	6" line 252 from RWST-U3	Phase 2 MW-42,43&45	Soil Analysis U3 Storm Drain	Open		Axelson	
1	12" line 181 from RWST to PAB U2	Phase 2 MW-42	Soil Analysis Storm Drains	Open		Lavera	
1	16" line 155 from RWST to PAB U3	MW-41,43&45	Soil Analysis Storm drains	Open		Lavera	

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
1	4" floor drain under WHT pit slab 2" PWR line from RAMS	Phase 2 MW-41,43 45	Soil Analysis Storm drains	Open		Lavera	
1	4" floor drain under fan house mini containment	MW-46&45 B-Storm drains	N/A	Open		Lavera	
1	4" floor drain embedded at 15' of PAB	MW-45&46 B-Storm drains	N/A	Open		Lavera	
1	U3 6" drain line under containment mat.	MW-46 B-Storm Drains	Soil samples, storm drains, tracer test	Open		Lavera	
2	U1 West Pool	MW-42, MW-39	Tracer test HTO Mass Balance Report (Done) ABS Pool Leak Report (Done)	Fuel to be removed by 2 Q 2008 Of the two effluents stream (NCD and SFD) 25% of total tritium can be attributed to the U1 WFP leak. The ABS Pool Leak Report Identified through-wall and pool-to-pool leaks in U1 pool complex.	HTO Mass Balance Report (CR#???) ABS Pool Leak Report (CR #???)	English	
2	U1 Other Pools	N/A	N/A	Verify Drain are MT- No water		English	
2	U2 SFP	MW-30	Tracer Test Boron Regression Analysis (Done)	Boron Regression Analysis concluded a possible 1 to 2 gallon per day leak rate from the U2 SFP.	Boron Regression Analysis (CA#)	Axleson	

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
2	U2 RWST	Phase 2 MW-42 & storm drain	Physical Inspection			Drake	
2	U3 SFP	MW-45 & MW-44	U3 Tell-Tale Inspection Report (inhouse)	Tell–Tale drain system U3 Tell-Tale Inspection Report concluded that the valving was intact and not clogged.	????? U3 Tell-Tale Inspection Report (inhouse)	Hinrich	
2	U2 CVCS Tanks	MW-42	Physical Inspection	Inside PAB		Drake	
2	U2 Waste Tanks	MW-42	Physical Inspection	Inside PAB- High dose		Drake	
2	U3 RWST	MW-39&41	Physical Inspection	Open		Drake	
2	U3 CVCS Tanks	MW-42&43	Physical Inspection	Open		Drake	
2	U3 Waste Tanks	MW-41&43	Physical Inspection	Open		Drake	
3	IP-2 Transformer Yard - Turbine hall condensate drainage	MW-52 MH-3	Tracer test Physical Inspection	Open		Axleson	
3	U3 Operation of Main Steam supply to Auxilary Steam system.	Phase 2 B-Storm Drain MW-44&45	Tracer test Physical Inspection	Open		Drake	

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
3	IP-3 41' PAB Sump Pump Dishcharge to storm drain	Phase 2 MW-46	Physical Inspection	Open		Drake	
3	U2 PAB Sump	MW-111,33,34&35	Physical Inspection Tracer test	Open		Axelson	
3	U2 MOB	Phase 1 MW-31	Physical Inspection	Open		Drake	
3	U3 PAB Sump	Phase 2 MW-46	Physical Inspection	Open		Drake	
3	U3- Room with the rock, had pipe trench from PAB spilling into area below cable tunnel	MW-46	Physical Inspection Tracer test	Open		Drake	
4	U2 Resin Spill in alleyway next to FSB	MW-32&31	Soil Analysis	50.75(g) record		Lavera	

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
4	U2 Blowdown atmospheric release	U/2 Storm drain	Calculation	Known release/Quantify in ODCM		Sandike	
4	U2 SG Tube Leak Feb 2000	N/A	N/A	Closed Historical Report		Hinrich	
4	U3- area between VC, FSB, PAB, (aka Pigeon Pit)	Storm drains MW-46	Physical Inspection Soil analysis	50.75(g) record review		Lavera	
4	U3 Sewage septic field	MW-48	Soil Analysis	50.75(g) record review		Lavera	
4	U3 SG Tube Leak Oct 1989	N/A	N/A	50.75(g) record review		Lavera	
4	U3 RWST base of Hill contaminated Water stream	Phase 2 MW-39,41&43	Soil Analysis	Open			

Attachment 2: Troubleshooting Strategy and Action – Tritium in the Groundwater.

Mode	Possible Cause	Well Testing Role (How will the wells tells us if this is the source?)	Specific Test for this possible cause. (Inspections, draining..) Radio-Chem Signature	Conclusion / Comments	Documentation	Owner	Date Due
3	U3 T-1 and T-2 core bores analysis	MW-38&48	Tracer Test	Open		Lavera	
3	U3-1,2,3 Canal Monitoring Wells	Storm Drains	Tracer Test			Lavera	
2	U2 SFP Transfer Canal	MW-30 MW-111,33,34&35	Physical Inspection via camera and tracer.	Open		Deeds	