

**CR QA Record**

**Condition Report:** 2005104789    **Status:** Transmitted    **Entry Date:** 04/28/2005    **Unit:** H1

**Discovered:** 04/28/2005 11:00:00AM    **Building:** Yard    **Event:**  
**By:** William E Duvall III    **Elev:**    **Date:** 11/07/2003  
**Phone:** 8-692-5866 33    **Room:**    **Time:** 12:00:00AM  
**Dept:** Hatch - Chemistry    **Location:**  
**Sect:** Chemistry

12

**Description of Condition:**

Based on a trend review of ground water sampling the tritium results from well T-12 spiked to 4.07E6 pCi/l on Nov 7, 2003. Tritium levels did not return to previous based line values until Nov 9, 2004. Well T-12 is located southwest of Unit 1 CST moat. This well T12 has historically trended higher than other sample points but this was the first significant increase since 2001. This CR is being initiated to ensure this increased trend is formally investigated to identify the cause. No state or regulatory reporting requirements have been exceeded. Please disposition this CR to Environmental Affairs SNC group.

**What is affected:**

High tritium concentration in ground water at Unit 1 CST

**How Discovered:**

While reviewing sample trends during ANI inspection.

**CR Type**

(033) Program Related

**Status**

COMP

**Dispatch**

**Work Event:**                      **WalkThrough:** No                      **Hold:** No                      **OPS Review Req:** No

**Dispatch Comment:**

An Apparent Cause Determination Report was written to address the issues in this CR and is attached in the Event Description or Failure Scenario field.

ANI Recommendation - Department Manager must review disposition and apparent cause prior to closure.

The Apparent Cause Determination has been approved by the Acting Chemistry Manager (JDB). All Action Items have been accepted by the respective department managers. The due date of this CR has been changed to 12/30/05. CAE 5/26/05

**Dispatch Reviewer:** sbrogers                      **UserID:**  
**Date:** 4/28/2005 12:31:36PM

**Equipment**

**Equipment:**

**Safety Class:**                      **Active:**                      **Type:**                      **Location:**  
**Nuc. Class:**                      **Tag:**                      **Team:**  
**Category:**                      **Event:**  
**Operability** \_\_\_\_\_  
**Status:**                      **Tracking#:**  
**TSLCO#:**                      **Type:**  
**Comment:**

**Initial Review**

**Power:** N/A                      **Mode:** N/A                      **RC Temp:** N/A                      **RC Pressure:** N/A

**Event Related Evolutions In Progress:**

N/A

**Imm. Reportable No**    **Hours:**                      **Date:**                      **Time:**                      **NRC Rpt. #**

**Compensatory Actions Taken:**

Initial review by Dispatcher determined that Ops Review not required

JH29

# CR QA Record

Condition Report: 2005104789

Status: Transmitted

Entry Date: 04/28/2005

Unit: H1

## Regulatory

Received Date: 4/28/05 Severity Lev: 3 Reportable?  Impact to Plant: Economic

Short Explanation: n/a

Explanation: At ANI exit, AGMPO requested that this CR be classified as SL3. KAU 4/29/2005.

The due date of this CR has been moved to 12/30/05 to match the due date of the last Action Item that is due. CAE 5/26/05

RCCA Tab, page 4, "Approved by" and "Final Approved by" resigned to comply with proper procedure review of apparent cause. MJUC 12/30/2005.

RCCA required?  Resp. Dept: Corporate - Environmental Affairs Disp. Resp. Dept: Corporate - Environmental Affairs

Due Date: 12/30/05 Reviewed By: mjcorbit 12/30/05 1:42 pm

Approved By: cmdixon 4/29/05 1:14 pm

Closed By: Matthew John Corbitt 12/30/05 1:59 pm

TITLE	TO	PER	DATE	TYPE	NUM

PRB/PORC review?  Meeting Num: Date:

PRB/PORC Comments

## Trending

Major category: Other

Safety func. affected: NA

Cause Dept: Corporate - Environmental Affairs

Event Description:

Event Code Group1: OtherEvents/Others/Other

Event Code Group2: Chemistry Related Events/Missed Chemistry Samples/Out of spec.

Event Code Group3:

Event Code Group4:

## Disposition

Department: Corporate - Environmental Affairs

Section: Corporate - Environmental Affairs

Person: Mary Beth Lloyd

Prepared By: dahostet Date: 5/10/05

Approved By: dahostet Date: 12/29/05

Status:

Final Review Required

### Disposition:

An Apparent Cause Determination Report was written to address the issues in this CR and is attached in the Event Description or Failure Scenario field.

ANI Recommendation - Department Manager must review disposition and apparent cause prior to closure.

The Apparent Cause Determination has been approved by the Acting Chemistry Manager (JDB). All Action Items have been accepted by the respective department managers. The due date of this CR has been changed to 12/30/05. CAE 5/26/05

## Performance

Maint. rule scope? N/A

Function Failure? No

Is this an MPFF? No

Justification By: cmdixon

4/29/05

MR assigned to:

**CR QA Record****Condition Report:** 2005104789**Status:** Transmitted**Entry Date:** 04/28/2005**Unit:** H1**Justification:**

Ground water not MR

**RCCA****Status:** Final Review Required**Event desc. or failure scenario:****PROBLEM STATEMENT**

Based on a trend review of ground water sampling from well T12 on the southwest side of the Unit 1 CST moat, tritium levels spiked to 4.07E6 pCi/l on Nov. 7, 2003. Well T12 tritium has historically trended higher values than other sample points with several spikes in its history, but this was the first significant increase since 2001.

**APPARENT CAUSE(S) AND CAUSE CODE(S)**

Why did the ground water tritium in well T12 spike up by an approximate factor of fifteen over the course of six months in 2003 to a level approximately ten times higher than ever seen before?

During the investigation for CR #2005104789, data from over the past 20 years from Hatch piezometer wells around the Unit 1 CST moat was reanalyzed and new trend lines plotted. The trending graph for the T12 well over 20 years of data shows that the amount of tritium in the well has been increasing in general since about 1992. The graph also shows what appear to be four peak time frames over that 20 year period. These peaks appear to last for several sample periods over the course of anywhere from six months to two years and then they drop back down slightly above where they started from.

Possibilities of why the peaks could be occurring, in order of reasonable probability are:

- 1) A continuous small leak with occasional higher levels of tritium is occurring from the Unit 1 CST or associated piping.
- 2) A sporadic leak of some nature is occurring from the CST or associated piping on a random basis and as the tritium decays and is dispersed in the ground the tritium level decreases back to near pre-peak levels.
- 3) Tritium from the SFP spill in the mid 1980's or some of the leaks described in the historical documentation is gradually seeping down to the wells over the years with some isolated pockets of the water (with higher tritium values than the diluted surrounding ground water) getting into the wells sporadically. However, this scenario seems unlikely since approximately two tritium half lives has passed. For the 2004 sample at 4.07E+06 pCi/l, the original SFP water or water leaks would have had to have a tritium concentration of about 1.6E+07 pCi/l.

Why has the tritium in T12 and other wells around the Unit 1 CST moat trended upward over the past twenty years?

Data from six other wells directly around the Unit 1 CST were trended. These six wells were not sampled as frequently as T12, but their data starts at the same time and continues through 2002 for two of the wells and through 2004 for the other four wells. All six wells show elevated levels of tritium from 1985 until the sampling was stopped. In 5 of the wells the tritium appears to be trending upward from mid 1992 until the sampling was halted. The sixth well (T15) was trending downward until about 2000 and 2001 where it shows a marked spike in tritium which then dropped back down to near pre-spike levels by 2004.

Possible causes for the increasing trends of tritium in these seven wells are the same as in the first why statement above.

Why has the tritium in the wells around the Unit 1 CST moat averaged two orders of magnitude or more above that found in the river?

The tritium levels for these wells in the ground water data base show elevated tritium levels from the start of the database in 1985. This implies the tritium was first introduced previous to this database. The only explanation for the elevated and increasing tritium over natural levels such as in the river water is that the tritium was introduced into the ground water by some manmade process and may have continued to be introduced either continuously or sporadically over the years. It is unknown what the ground water tritium levels are outside the protected area around Hatch, but the river water tritium values are known all the way back to pre-op days. River water tritium values have ranged from <MDA to 358 pCi/l.

**CAUSE CODE(S)**

K5B - Managerial Methods (INPO Code): Corrective Action: Corrective action for previously identified problem or previous event cause was not adequate to prevent recurrence.

**BROADNESS REVIEW (Required for QA Findings, otherwise optional)**

Historical Documentation - excerpts taken from a document sent to the site in 2001:

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## Plant Hatch On-Site Tritium in Groundwater Monitoring

## Introduction:

Several questions have been raised concerning the Plant Hatch Groundwater Monitoring Program. This report summarizes the history of the program and details the current sampling and reporting requirements for the program. It also addresses the question of whether any wells, specifically wells P13B and T18 can be dropped from the program.

The discussion of the program in this summary is not intended to report on the events that contributed to the elevated levels of tritium in the on-site groundwater samples or on the historical levels of tritium detected. This report covers only the history of the sampling and reporting commitments as the program evolved and the status of the program over the past five years.

## References:

64-CH-ADM-001-OS - procedural sampling requirements for on-site groundwater H-3 wells  
64-CH-SAM-004-OS - sampling procedure  
FSAR 2.4.13 Groundwater  
Reportable Occurrence Report 50-321/1979-021 and all revisions and updates through 1984  
Pre-Op REMP Program  
REMP Reports 1974 through 1983  
Data sheets HPX-0506 "Release Via Unplanned Route: Groundwater"

## Discussion Pre-op Through 1985:

The Pre-op Radiological Environmental Monitoring Program (REMP) included two on-site wells, one on-site subsurface drainage ditch, and one off-site background location. Technically, on-site wells would not be part of the REMP program and it is not clear why on-site samples were included in the pre-op. However, it is not completely out of the ordinary. During pre-op both on-site and off-site samples were taken for several different media. Groundwater samples were taken as follows: Grab sample Quarterly Jan 1972 to Aug 1973; Grab sample Annually Aug 1973 to Jun 1974; Grab sample Quarterly Jun 74 to Sep 1974.

The 1974 REMP Report, which covered September 12 through December 31, 1974, did not include groundwater data. An undated memo to file from Bill Ollinger stated that the on-site groundwater sampling should be stopped because it was not required. A supplemental REMP report stated that groundwater was not analyzed during the 4th quarter of 1974 because it was not required by the Environmental Tech Specs (ETS).

The 1977 REMP Report stated that the ETS required one indicator and one background location for groundwater sampling but indicated that groundwater samples were only required in the event of an accident or unusual circumstance. Although not required, samples were collected occasionally from two deep wells, a subsurface drainage ditch, and three piezometers. The 1977 4th Quarter results were reported in the REMP report as "very high" for two of the eight samples (north outfall and N-7-A). The ETS did not specify a Reporting Level.

The new ETS for Unit 2 went into effect November 16, 1978. The new Unit 2 ETS did not require groundwater sampling but they did establish a Reporting Level for tritium in environmental water samples of 3.0 E4 pCi/L. The old Unit 1 ETS which did require groundwater sampling in the event of an accident or unusual circumstance did not include a Reporting Level and required Non-Routine Reports only in the case of a "significant environmental impact". In 1978 and early 1979, several on-site groundwater samples were found to have elevated tritium levels. Discussion in the 1978 REMP report questions whether a Non-Routine Report was required for the samples because the on-site wells are not "environmental samples" and should not be subject to the reporting levels. Finally the decision to submit a Non-Routine Report pursuant to ETS 3.2 and 5.7.2 was made in order to be conservative. The buried open pipe near the Recombiner Building, which was determined to be the source of the increased tritium levels, was discovered in March 1979. This was reported to the NRC as LER 50-321/1979-021 and included the Anomalous Measurement Report. The 1978 REMP report discusses the sampling frequency and results through June 1979.

Quarterly updates to LER 50-321/1979-021 provided a report of all samples that exceeded 3.0 E4 pCi/L and continued until 1984. The level 3.0 E4 pCi/L was the Reporting Level for environmental water samples established by ETS. This was used as the cut-off level although the samples in question were all on-site and therefore not "environmental" samples. In addition to these reports, the status of the groundwater tritium monitoring program continued to be reported in the Annual REMP reports through 1983 although the on-site groundwater samples were not true REMP samples.

Letter number GM-84-115, dated 2/8/84, from H. C. Nix to the NRC, stated that after 1983 the problem would not be reported quarterly or annually, pursuant to the ETS. This decision was based on a meeting with the NRC on 12/19/83 where it was determined that the elevated tritium levels did not pose an environmental concern. This letter closed LER 50-321/1979-021 and ended the quarterly updates to the LER, but the letter also committed that special quarterly updates would continue to be provided to the NRC.

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These quarterly special reports were sent from L. T. Gucwa, Chief Nuclear Engineer Georgia Power, to the NRC and provided a report of all samples that were elevated. These reports were submitted from the 1st quarter 1984 to the 1st quarter 1985.

Letter number NED-85-582, dated 8/16/85 from Gucwa to the NRC, referenced the decision to cease reporting the groundwater data as updates to the LER or as part of the REMP after 1983 and announced plans to stop submitting the quarterly special reports as well. The commitment was made that although the reporting would stop, the "on-site groundwater monitoring program would continue and records would be maintained."

Letter number 85-4565, dated 9/12/85 from the NRC to Gucwa, was a response to the letter from Gucwa stating the intention of stopping the quarterly reports. The NRC allowed that because the intention was to stop the reporting only and not to change the "substance of the program" the proposal was accepted.

1985 to Present:

Regular reports are not required as long as the tritium levels remain in the expected range. There is no reporting level for on-site groundwater samples and historically values as high as  $8 \text{ E}05 \text{ pCi/L}$  have been detected. In comparison, the highest sample from the past five years was  $4.6 \text{ E}5 \text{ pCi/L}$ .

In 1985, when the commitment to continue the on-site groundwater monitoring program was made, the program was not clearly defined in a procedure. In 1988, the program sample locations and sample frequencies were outlined in procedure 64CH-ADM-001-0S Rev. 4. The groundwater sampling program continues to be managed in accordance with procedure 64CH-ADM-001-0S Rev. 16. Dropping a location from the program or changing the frequency of sampling will require a procedure change.

Location P13B has been dry since 1984. Sampling at this location began in 1982 after a condensate demin precoat tank overflowed in the Unit 2 Turbine Building. Well P13B and several others in the vicinity were sampled in the follow-up to that spill. Another well in the vicinity of P13B that is included in the program is N5B. However, samples have been unavailable at this location since 1993. The few samples that were collected at this well were very low levels, which indicates that the spill had not affected tritium levels at that well at that time.

Well T18 has been dry since 1988, but prior to that time, the levels were consistently in the  $\text{E}4 \text{ pCi/L}$  range. In investigating the results of the Groundwater Monitoring Program in the vicinity of T18, which is near the CST-1, it was discovered that tritium levels at T12 had been elevated since May of 1999. Although the levels were above  $3.0 \text{ E}4$ , since these wells are on-site, the environmental Reporting Level does not apply and no special report was required. However, this increase should be noted and investigated to determine the possible cause. The wells in this area should also be observed more closely to determine if the trend is increasing for the entire area, which could indicate a new tritium source. See the attached table "Samples with Activity Greater Than  $3.0 \text{ E}4 \text{ pCi/L}$  since 1996" for a list of all elevated samples in the past five years and the attached graph "Quarterly Samples (1996 to June 2001)" for the trend at well T12.

Because of the increase in levels at T12, which is near T18, it is questionable whether location T18 should be dropped from the program. However, T18 has been dry for over 10 years and there are several other wells in the vicinity to monitor any changes. T18 can be sampled if it seems appropriate, but it may not need to be regularly sampled.

In conclusion, the commitment was made to the NRC in 1985 that the groundwater monitoring program would be maintained in order to track the potential movement of tritium from the two distinct areas where it was detected. The first area is in the vicinity of the Recombiner Building where an open line was discovered in 1978. The second area is near the CST-1 where pumps and possibly the dyke were found to be leaking in 1982. The groundwater monitoring program may be revised as long as it continues to monitor these areas for possible movement and for increases in tritium levels which could indicate new sources. This program should continue until the written NRC commitment is rescinded from and acknowledged by the NRC.

End of Historical Documentation

#### RECOMMENDED CORRECTIVE ACTIONS

Much data involving ground water tritium at Hatch exists. The vast amount of data may show other problem areas; especially since Hatch spilled a substantial amount of spent fuel pool water on the ground back in the 1980's and had several other leaks around the CST and recombiner building in the past.

Recommendations for corrective actions include:

- 1) Establish or re-establish a sampling program for all pertinent wells including drinking water wells. Include trigger points for levels of tritium and/or other nuclides in ground water and drinking water which

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require increased monitoring or other actions. (Chemistry)  
 2) Continue researching the archived ground water tritium data for possible causes and start dates and extent of the tritium to determine if further actions are warranted. (Environmental Affairs)  
 3) Search historic operational data for events and information which would help identify possible causes, dates, and the extent of the tritium to determine if further actions are warranted. (Chemistry)  
 4) Determine if past or present underground leaks from the CST and associated piping are the cause(s) for increased tritium levels. (Engineering)

**Investigation scope/broadness review**

N/A

**Is this a repeat event?** Yes                      **Was Previous RCCA adequate?** N/A

**Repeat event review:**

Ground water tritium from the piezometer wells around the Unit 1 CST have shown elevated levels of tritium since 1978. Sporadically over the years, there has been some spiking of the tritium levels and there has been a continuous general increase in ground water tritium in these wells since 1992.

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Other train/channel/unit checked   | <input type="checkbox"/> Other similar process checked  | <input type="checkbox"/> Other similar component      |
| <input type="checkbox"/> Pencil and Paper narrative         | <input type="checkbox"/> Cause identification worksheet | <input type="checkbox"/> Apparent cause determination |
| <input type="checkbox"/> Barrier analysis                   | <input type="checkbox"/> Fault tree analysis            |   |
| <input type="checkbox"/> Change analysis                    | <input type="checkbox"/> Kepner-Tregoe analysis         |   |
| <input type="checkbox"/> Event and causal factor flow char. | <b>Other:</b>   |   |

**Description of causes:**

The historical data in the "Event description or failure scenario" section above describes some of the causes for high tritium in the ground water in the past.

**Cause Dept 1:** Corporate - Environmental Affairs

**Cause Dept 2:** Hatch - Chemistry

**Cause Dept 3:** Hatch - Engineering Support

**Group1:** Managerial Methods (INPO Code)/Corrective Action/Inadequate to prevent recurrence

**Group2:**

**Group3:**

**Group4:**

Item	Description	DueDate	Responsible Dept.
Section	Concurrence?	Respon.Person	ConcurApp    Date    AI
1	Continue researching the archived ground water tritium data for possible causes and start dates and extent of the tritium to determine if further actions are warranted.	12/30/05	Corporate - Environmental Affairs
	<input checked="" type="checkbox"/>	Mary Beth Lloyd	dahostet    6/1/05    2005201807
2	Establish or re-establish a sampling program for all pertinent wells including drinking water wells. Include trigger points for levels of tritium and/or other nuclides in ground water and drinking water which require increased monitoring or other actions.	12/30/05	Hatch - Chemistry
	<input checked="" type="checkbox"/>	William E Duvall III	Chemistry    mjcorbit    7/14/05    2005201808
3	Search historic operational data for events and information which would help identify possible causes, dates, and the extent of the tritium to determine if further actions are warranted.	12/30/05	Hatch - Chemistry
	<input checked="" type="checkbox"/>	Matthew John Corbitt	Chemistry    mjcorbit    7/14/05    2005201809

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4 Determine if past or present underground leaks from the CST and associated piping are the cause(s) for increased tritium levels    12/16/05    Hatch - Engineering Support

Reactor Engineering Systems	<input checked="" type="checkbox"/>	Kelsey D Rooks	revarnad	7/12/05	2005201834
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- Sequence of event(s) documents attached
- Personnel statement(s) documents attached.
- Event(s) review documents attached.

**RCCA prepared by:** dahostet    5/18/05  
**RCCA approved by:** mjcorbit    12/30/05  
**RCCA final approver:** weduvall    12/30/05

### Comment

Changed "Responsible Dept" from "Corporate-Environmental Services" to "Corporate-Environmental Affairs" due to department reorganization and renaming of department. ....MAS  
 6/10/05

### Related Documents

#### Documents: (DCMT)

Class	Title	Entity	DocumentumID	Ver.	Ver Type	Doc. Num.
QA Record	QA Record - Version 1.0	VCRT	AR200205792	1.0	F	CR:2005104789

#### MP5 Documents:

Class	Type	Title	MP5 Doc. ID.	Entity
Resolution document	TABL	System gen AI#2005201807	2005201807	VCRT
Resolution document	TABL	System gen AI#2005201808	2005201808	VCRT
Resolution document	TABL	System gen AI#2005201809	2005201809	VCRT
Resolution document	TABL	System gen AI#2005201834	2005201834	VCRT

#### Web Documents:

Class	Type	Title	URL

### Custom Fields

Property	Value