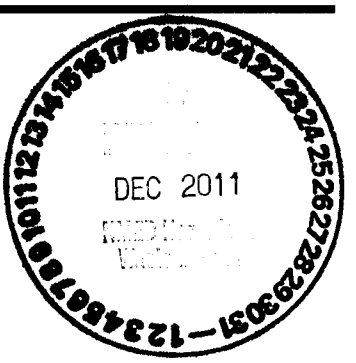
ENTERED

Allen, Pam, NMENV



From: Kliphuis, Trais, NMENV
Sent: Monday, December 19, 2011 1:22 PM
To: Allen, Pam, NMENV
Cc: Kieling, John, NMENV
Subject: FW: Summary TRUPACT 132
Attachments: Summary TRUPACT 132.docx

Pam,

Whenever you have a chance could you add this to the WIPP record?

Thanks.

-----Original Message-----
From: Kieling, John, NMENV
Sent: Monday, December 19, 2011 11:08 AM
To: Kliphuis, Trais, NMENV; Holmes, Steve, NMENV; Hall, Timothy, NMENV; Maestas, Ricardo, NMENV; Davis, Jim, NMENV
Subject: FW: Summary TRUPACT 132

-----Original Message-----
From: McCauslin, Susan - DOE [mailto:susan.mccauslin@wipp.ws]
Sent: Monday, December 19, 2011 11:06 AM
To: Kieling, John, NMENV
Cc: Franco, Jose - DOE; Ziemianski, Edward - DOE; Basabilvazo, George - DOE; Chavez, Rick - RES
Subject: Summary TRUPACT 132

John,

At our meeting on December 8 you had asked for a written discussion concerning the receipt at WIPP of TRUPACT 132. Attached you will find that discussion. Please feel free to contact me if you have further questions or would like further information on this subject.

Susan McCauslin, CPG
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DISCUSSION OF CONTAMINATED PAYLOAD FROM TRUPACT 132

BACKGROUND: When the original Hazardous Waste Facility Permit (Permit) was negotiated, the Applicants (DOE and WTS) suggested using the principle of co-detection to determine if there has been a spill or release of hazardous waste from a mixed waste container. Co-detection is not a mechanism to regulate the management of radioactive waste. Instead, it uses the presence of the radioactive contamination as a very sensitive indicator that hazardous waste contamination may also be present. Co-detection means that if radioactive contamination is found on the outside of a waste container, the assumption would be made that hazardous waste is a co-contaminant, if the contamination was the result of a loss of confinement. The principle of co-detection is included in the Permit as Attachment G3 and is required to be followed by Attachment A1, Section A1-1d(2) for waste unloading. When radioactive contamination is found, the Permittees initiate an investigation to determine if there has been a spill or release from the container or if there is another source of the contamination. If a hazardous waste spill has also occurred, decontamination provisions in the Permit are triggered.

DESCRIPTION OF INCIDENT: On November 8, 2011, the payload in TRUPACT #132 was found to be contaminated when the ICV lid was raised and the interior of the lid and the top of payload were swiped for contamination as required by Permit Attachment G3, Section G3-4a and Table G3-2. This initiated a process to determine if the contamination was due to a spill or release of hazardous waste from a container within the payload. There was no evidence of a breached container upon visual inspection of the payload. The payload was moved into the Shielded Storage Room pending further investigation. TRUPACT 132 contained waste from Oak Ridge waste stream OR-ISTP-CH-HET.

REGULATORY ANALYSIS OF THE INCIDENT: Analysis of swipe samples from the payload by the WIPP Labs determined that the contamination was ^{210}Pb, a beta-emitter that results from the decay of ^{222}Rn. ^{222}Rn is an off-gas from the radioactive decay of ^{226}Ra and ^{238}U in the waste. This off-gas is released from the container through the filter vent that is installed on every container of TRU waste. Furthermore, the analysis determined that the actinides in the waste (^{241}Pu, ^{241}Am) were not present in the contamination. The absence of the actinides confirmed there had been no loss of containment of the payload leading to the contamination. Laboratory analysis also confirmed the absence of ^{90}Sr and other pure-beta emitters (^{99}Tc, ^{63}Ni), ruling out the possibility of external contamination from an unknown source. Because the release of hazardous waste depends on a loss of containment, the conclusion is that this radiological contamination was not also a hazardous waste contamination event. It did not constitute a spill or release of hazardous waste, and therefore was not subject to the Permit requirements in Attachment A1 regarding the discovery of hazardous waste contamination on the outside of containers of TRU mixed waste.

The process for handling the contaminated payload was to bag the payload followed by emplacement. Since the payload in this instance includes the contaminated TRUPACT pallet and guide tubes, some consideration is necessary to determine compliance with the Permit. First, bagging did not involve plugging filter vents, and the bag material (brattice cloth) is compatible with the waste. The additional plastic material has been included in the calculation of how much magnesium oxide (MgO) backfill is needed. Second, the TRUPACT-II pallet is made of aluminum. This metal was considered in the performance evaluation as a non-ferrous reactant since it is common in the waste. There is a minimum amount of aluminum that is required to be disposed, and this minimum has already been met. Aluminum is a material parameter weight that is tracked in the Waste Data System and a notation of the amount of aluminum has been made. Recording the quantity or aluminum and including the bagging

material in the calculation of MgO will satisfy any EPA requirements imposed through the Compliance Certification.

ADDITIONAL INFORMATION: Several questions have been raised regarding this shipment and the protection of workers and the public. The following provides a discussion.

QUESTION: IS THIS THE FIRST TIME THIS HAS HAPPENED?

RESPONSE AND DISCUSSION: No, it is common to see radon in shipments when they arrive at the WIPP facility. Usually, it manifests itself as high counts on the radiological assessment filter which is the first radiological check of the payload inside the shipping container. However, when the filter is counted a second time, often after several hours, the number of counts decrease, indicating the presence of radon and not actinide contamination. Radon decay is one of several factors that combined to make this contamination event abnormal.

First, the TRUPACT 132 payload container content included ^{238}U and ^{226}Ra as part of the specific Oak Ridge waste stream and at higher content levels compared to other payloads from ORNL and other waste streams that have been shipped to the WIPP facility for disposal from around the DOE complex. There was approximately 100 times more ^{226}Ra in TRUPACT 132 than in other payload assemblies found in this campaign. That, combined with a higher mass of ^{238}U, set this payload apart from a waste perspective.

Second, the ^{238}U decay chain undergoes 14 decay processes before reaching stability as ^{206}Pb. This decay process includes alpha and beta radiation and includes ^{226}Ra (part of waste stream) and ^{222}Rn (radon gas).

Third, the accumulation of radon and radon daughters is affected by environmental factors such as temperature, humidity, wind, and static electricity, and rate of generation which is directly proportional to the amount and the physical form of the radon emitting isotopes. The environmental conditions at Oak Ridge during payload processing included a temperature inversion with 100% humidity and calm winds (< 3.5 mph), creating ideal conditions for the accumulation of radon and radon daughters.

Fourth, as a gas, radon vents through the filters on waste containers and become trapped inside a TRUPACT container as it is sealed and leak tested for shipment from a generator site to the WIPP facility. The off-gassing can continue during transport and staging at WIPP, increasing the concentration within the TRUPACT. The subsequent opening of the TRUPACT allows the radon to be released to the surrounding environment and with the larger working space of the CH Bay and additional ventilation the radon is dispersed and diluted which is why it is not detected in the general working areas of the CH Bay. However, the non-gaseous daughter products are deposited on the surfaces of the payload containers. Normally, these daughter products are at very low levels. In the case of TRUPACT 132, the high concentration in the TRUPACT resulted in surface contamination as high as 3,100 disintegrations per minute (dpm).

Fifth, this was the first shipment of waste from this Oak Ridge waste stream.

QUESTION: HOW ARE WORKERS PROTECTED FROM THIS CONTAMINATION?

RESPONSE AND DISCUSSION: Radon is routinely detected at DOE sites, including the WIPP facility. The DOE has prescribed limits and action levels, and many times the detection of radon creates response actions and delays in work activities. The associated alpha-emitting activity detected will decay over a short period of time (minutes to hours), allowing work activities to resume.

The Radiological Protection Program at WIPP is implemented to ensure personnel protection. Personnel protection methodology includes the use of Radiological Assessment Filters prior to opening TRUPACT containers to prevent exposing personnel to contamination that may exist within the TRUPACT container. Additional methodology implemented throughout waste processing includes air monitoring for internal exposure control; dose rate surveys for external exposure control; and contamination surveys for exposure control. Procedural controls are implemented to ensure appropriate actions are taken upon identification of elevated radiological readings (dose and contamination).

In the instance of TRUPACT 132, contamination was controlled by wrapping contaminated surfaces with shrink wrap and placing the payload in the Shielded Storage Room, an area in the Waste Handling Building designated for such circumstances. Personnel dose is controlled at the WIPP facility using time, distance and shielding. Time is monitored using a dosimetry program, distance is implemented by setting up radiological boundaries, and shielding is accomplished by using locations such as the Shielded Storage Room.

QUESTION: WHAT IS THE SIGNIFICANCE OF THE 3,100 DPM BETA DOSE RATE WITH REGARDS TO HUMAN HEALTH?

RESPONSE AND DISCUSSION: The contamination detected on TRUPACT 132 is considered to be a low level of beta contamination because it does not pose a health hazard as external exposure for the whole body or skin dose. Being exposed to this contamination is equivalent to receiving 0.00018 mrem/hr at 1 cm from the surface of the TRUPACT pallet. To put this in perspective, the natural dose rate due to cosmic radiation for Carlsbad is 41 mrem/year or 26 times higher than the dose created by the TRUPACT 132 payload. This notwithstanding, the as low as reasonably achievable (ALARA) policy in effect at the WIPP facility dictates that the payload be handled in a manner that minimizes personnel exposure and the spread of contamination.