Poston-Brown, Martha

From: Munski, Ken D. <Ken.Munski@terracon.com>
Sent: Thursday, January 21, 2016 3:35 PM
To: Poston-Brown, Martha
Cc: Gilchrist, Katie D; Hoffmann, Matthew D.
Subject: [External_Sender] FW: Gauge Incident Report
Attachments: Gauge Incident at Fed Ex Ground Facility Great Falls MT Terracon Consult....pdf; Attachment for Nuc Gauge Assessment (4).pdf; leak test result.pdf

Martha-

Attached is the requested Gauge Incident Report for Incident Number 51597.

Please call or email if you have questions or need additional information.

Kenneth D. Munski
Principal
Department Manager I Construction Materials
Terracon
1392 13th Avenue SW I Great Falls, MT 59404
P [406] 453 5400 I F [406] 761 6655 I M [406] 899 4118
kdmunski@terracon.com I terracon.com

Terracon Consultants, Inc.

Great Falls, MT

NUCLEAR GAUGE INCIDENT REPORT

Incident Event Number: 51597

Date: 12-10-2015

Time: 12:40 PM

Gauge Manufacturer, Model and Serial Number: Troxler Model 3440, Serial Number 37384

Project Name: Federal Express Ground Facility, Great Falls, MT

Terrracon Project Number: C4151165

Project Location: Great Falls Agritech Park, Lot 5 (approximate coordinates 47.5191N/-111.2012E)

Construction Contractor/Subcontractor: SE/Z Construction, Boise, ID (General) and M&D Construction, Great Falls, MT (Earthwork Sub-contractor)

Description of Accident: Terracon technician, Chad Stroop, was bent over the gauge taking a reading as large dozer starting pushing a windrow of pit-run structural fill to form the next lift. The large front blade on the dozer (nearly 4 feet high), along with a recently delivered windrow of loose fill material, apparently obscured the dozer operator's view of the technician. The technician was facing away from the dozer and first sensed danger as the gravel being levelled came onto his feet. At that moment, the technician jumped up and turned around, hitting the dozer blade with his left hand. By then, the dozer operator had seen the technician and stopped the machine. The dozer blade appears to have made light contact with the metal tower housing and the steel wiper cap which retains the wiper (rubber seal) on the upper surface of the gauge (topshell), leaving a small mar (estimated at ½ inch by 1/8 inch) on the metal tower housing and a barely perceptible mar on the wiper cap. Function of the wiper (rubber seal) was not impaired and the source rod showed no indication of being contacted. A very small (1/8 inch) triangular surface mar was visible on the plunger block attached to the lower surface of the handle assembly. The plastic case outboard of the tower housing near the lower left corner (facing the control panel) of the gauge was cracked, apparently by loose gravel moving ahead of and below the dozer blade. The total crack length was about 8 inches with the crack opening width varying from hairline to about 3/16 inch. The source rod extension/retraction mechanism was clearly undamaged and the source retracted normally, so the source was secured in the safe position, surrounded by the protective shielding elements within the gauge. Please refer to the photographs of the damaged gauge and gauge diagrams attached. After assessing the gauge damage, Chad called me for direction. In light of immediate and potentially severe physical safety concerns for the technician and the clear absence of possible radiation hazard associated with a non-retractable source, I directed Chad to depart the work area and return immediately to the office with

the gauge, where I verified his assessment of the source being secure with in the gauge shielding. I visually verified the source rod as being intact and that the source was retracting normally. I also verified dose rate measurements as being normal near the gauge and consistent with another (undamaged) gauge. I then contacted and discussed the incident with Katie Gilchrist (WOG RSO), Andy Boehm (WOG Corporate Safety Professional), Chad Stroop (Testing Technician), Matthew Hoffmann (Office Manager) and Mike Walker (Senior Project Manager, North Rocky Mountain Division). The gauge was returned to storage in our laboratory.

Description of Gauge Damage: See description above and gauge photographs/diagrams attached.

Comments: The incident described could have resulted in severe, or even fatal, injury to our technician. Concern Chad's potential exposure to serious physical injury was my primary concern at the time of Chad's call, since the gravity of a near miss with a large dozer was apparent. At the time of his initial call, Chad relayed his assessment of the gauge condition, including a detained description of the his gauge observations, along with a report regarding the operation of the source retraction/shielding system . Chad's field assessment was based upon his training, experience and familiarity with the specific gauge being used. The shielding capabilities of the gauge and source rod condition were assessed as uncompromised by Chad in the field. Based upon his description of the gauge condition and retraction system operation, I concurred with that assessment by phone. Chad has been operating nuclear gauges out of our laboratory for 9 years and was originally trained through our internal class, with several refresher classes completed since. The training included detailed descriptions of gauge components, with emphasis on the source rod construction to provide guidance in the event of gauge damage. A factory source rod "trainer" has used to illustrate the source rod make up to permit the field technician to effectively assess the severity of gauge damage relative to the risk of radioactive material loss (see photo attached). The risk of radioactive material loss arises primarily from the possibility of Cs-137 escaping the gauge within the small stainless steel capsule contained inside of the hollow rod segment welded (and threaded) onto the end of the source rod. The gauge condition description from the field presented, in my opinion, a solid indication that no loss of radioactive material could have occurred, since the source rod was visually intact and the source retraction mechanism was working properly. Based upon Chad's description of the gauge, radioactive material release was far less of a concern than the physical danger associated with (then) unknown details regarding site circumstances leading to the very serious near miss. In the situation confronted, it was my judgement that the protocol for securing the construction area surrounding the area of a significantly damaged gauge (including a non-retracting source, consistent with Section 20.

A. of the Terracon Materials License) should not be employed, due to potential physical risk to our technician. That is, the limited benefit of field confirming the absence of in-ground radioactive material with our survey meter was not commensurate with my perceived risk of severe physical injury associated with our technician's continuing presence at the immediate site of the incident. It was my judgement that Chad should depart the area of the near miss and return to the laboratory as soon as possible with the still operable gauge, in spite of having a cracked case.

In the laboratory, our survey meter was used to evaluate the dose rate at varying distances (5, 10 and 20 feet) from the damaged gauge vs. dose rates from an undamaged gauge at the same distances. The dose rates were very close at each of the test distances for the two gauges. Please reference the attached data sheet. We also performed a leak test on the gauge immediately after the incident, checking both the neutron and gamma sources and sending the swab to the analytical laboratory. On December 14, 2015, the leak test results became available which indicated that the swab was below detection limits for alpha and beta-gamma radiation (<0.0001 micro-curie), further verifying the integrity of the gauge shielding components. In light of our gauge damage assessment, along the available leak test results (non-detect), we plan to ship the gauge to InstroTek, Inc. for repair. The InstrTek shop has been contacted and they confirmed that shipment of the gauge by normal ground carrier protocols is appropriate. A replacement topshell is in stock, and repair/recalibration is planned. The electronics of the gauge remained fully operable subsequent to the incident described above.

My conversation with earthwork superintendent later in the afternoon indicated that the earthwork sub-contractor began providing an escort for our technician shortly after the incident described above. The escort's attention was focused on the site construction traffic while our technician was performing field density tests; further the escort was at all times standing, whereas our technician had to occasionally bend down or kneel to operate the gauge. The dozer involved in the near miss was a Komatsu D 65 WX (somewhat smaller than a Caterpillar D-8) with a blade height on the order of 4 feet. Structural fill windrows formed by delivery trucks on the structural fill pad itself were commonly about 3 feet high. The combination of the high front blade and tall windrows made our technician less visible to the operator than desired, so the escort solution was quickly employed by the earthwork sub-contractor. I concurred with the use of the escort to improve site safety for our field technicians. The following day, Matthew Hoffmann and I met with the superintendents for both the general contractor and the earthwork sub-contractor and reviewed the near miss incident, along with the corrective actions taken to improve site safety. We commended the site superintendents for the rapid recognition of an effective means to improve site safety and the willingness of the earthwork sub-contractor to immediately devote staff to the escort solution. Our technicians have been instructed to always face any visible construction equipment, regardless of the distance between the equipment and the technician. Construction activities on the day of the incident were unusual for our area, in that a reported 22 trucks were delivering structural fill onto a pad having nominal dimensions of 110 feet by 410 feet, with two large rollers working in conjunction with spreading equipment including the large dozer. The site was very busy in efforts to complete the fill prior to forecast arrival inclement weather, and the special operations regarding our testing technician were prudent.

Subsequent to the incident described above, we have held two staff meetings discussing safety topics related to the density gauges and the near miss incident of December 10, 2015.

By: _____

Send all kits and requests to:

SUNTRAC Services, Inc.
1818 East Main Street
League City, TX 77573
(281) 338-2133

ATTN: SIT-KIT

CAUTION: Conduct a survey on the outside of each package placed in the U.S. Mails. Any reading over 0.5 mR/hr at contact with the envelope or package shall not be mailed.

LEAK TEST INVENTORY/REPORT FORM

Company Name: NTL Engineering & Geoscience (13901105)

Address: 1392 13th Ave. SW City: Great Falls State: MT Zip Code: 59404

Isotope: Cs 137 / Am 241 Activity: 8.0 / 40 mCi

Source Serial No: 77-4545/78-2197 Leak Test Date: 12/10/15

Device Serial No: 37384

Manufacturer: Troxler Model No.: 3440

Smear Taken By: Mike Chapman

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This is to certify that the above described smear/swab has been assayed at our facilities for indication of source leakage.

Our findings show the leakage to be:

ALPHA	BETA-GAMMA
<.0001	<.0001

µCi (Wet)

Certified By: _____ Date: 12/11/15

SUNTRAC Services, Inc. Representative
(Texas Radioactive License No. L03062)

3303315