出國報告「出國類別：開會」

赴美國德州參加 Hotzone Conference 研討會及參訪德州農工

服務機關：內政部消防署
姓名職稱：周鴻呈 科長
派赴國家：美國
出國期間：111 年 10 月 15 日至 10 月 26 日
報告日期：112 年 1 月 6 日

摘要

臺灣的高科技產品已是國際著名，但隨著科技的進步，各種高污染性、不安定性的化學物質已被廣泛使用，遇有火災發生時，已非昔日單純之火災情況，其中化學物質火災往往同時會伴隨著高污染、二次爆炸等狀況，消防人員在面對如此日益複雜的複合性災害時，所面臨的危害程度，已非是數十年前的火災情境了，為了保護消防人員自身的安全，本署亦深知平時就要提昇專業訓練之強度及頻率，以面臨如此突發狀況之環境。

署長蕭煥章於就任消防署長後，立即強化消防訓練應與國際交流，期將我國消防人員之訓練課程內容、訓練設施之建置等情形與國際化接軌，本次更是結合民間捐款，派員參訪美國德州農工大學工程服務中心(Texas Engineering Extension Service,簡稱 TEEX）及參加 Hotzone Conference 研討會，以提升我國消防化學災害搶救訓練之專業，更是審視本署訓練中心自創建迄今約 10 年的時間以來，是否應再與時俱進的增加相關訓練設施。因此，本次指派本署訓練中心設施安全科科長周鴻呈偕同行政院環境保護署毒物及化學物質局及北區、中區、南區毒災應變人員一同赴美國德州農工大學 TEEX 進行交流考察，並參加 Hotzone Conference 研討會。

本次出國參訪及參加研討會的行程，係由國立高雄科技大學陳政任特聘教授安排，陳特聘教授也兼任南區毒災應變諮詢中心主任，長期以來投入化學災害應變實務，更是累積毒化災應變專業能力之專家，持續帶動提升我國毒化災應變實務技術與量能。

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壹、目的

本署訓練中心是我國中央政府所建置最大之消防訓練場地，自 99 年啟用迄今已逾 10 年，當年場域內所建置的訓練設施，多年來提供我國各縣、市政府消防局現職消防人員、中央警察大學消防系及臺灣警察專科學校消防科學生之火災搶救班、化災搶救班、義消班及民間救難團體等各種初階、進階等訓練班期使用，也因為訓練中心是我國最具規模之訓練場地，民間高科技電子公司、各類化學產業均要求所屬員工定期參加相關本署訓練中心辦理之消防訓練課程，以提昇員工消防自主的能力。因為美國德州農工大學（Texas A&M University）工程服務中心(Texas Engineering Extension Service,簡稱 TEEX）占地約 297 公頃，並建置有消防搶救、緊急應變管理、能源技術、公共安全管理及訓練、基礎災害應變訓練和其他專業領域之訓練設備，共計 132 項訓練設施，可以區分下列 4 大類別之訓練場區：Brayton Fire Training Field 火災訓練場、運用電腦情境模擬訓練指揮及管理之 Emergency Operations Training Center 緊急應變中心、都市搜救訓練場 Disaster City 災難城市及實際進行各項醫療救護情境操作之 EMS LAB 緊急醫療救護實驗室，本著「他山之石，可以攻錯」之原則，為了精進本署訓練中心之訓練量能，本次選派訓練中心設施安全科科長周鴻呈考察 TEEX，瞭解其訓練設施、課程規劃及訓練方式，做為消防中央之最大訓練中心日後規劃、增建及設施更新之參考。

臺灣的高科技產品已是國際著名，但隨著科技的進步，各種高污染性、不安定性的化學物質亦被廣泛使用，若發生火災時，已非昔日單純的火災災害，工業類火災事故發生後，人員傷亡及財物之嚴重損失，已非一般火災的規模及損失！同時往往會伴隨著高污染、二次爆炸等狀況，消防人員在面對如此日益複雜的複合性災害時，所面臨的危害程度，亦不是數十年前相同的情境。加上我國內之工業區與科學園區內之化學工廠、高科技廠房等，更是國家展、培育之重點產業，各類化學物質使用日益頻繁、種類繁多，加上用量也是逐年等比級數的增加，更是增加危害程度。且因化學物質多具有易燃、易爆之危害特性，於製造、儲存、運輸、操作使用之過程中，若稍有不慎，

將造成嚴重之火災爆炸或是化學物質的污染，因此，更是不容小覷。近 10 年來影響範圍最大、造成消防人員、民眾傷亡最嚴重的化災火災案件，當屬民國 103 年 7 月 31 日 23 時 55 分至 8 月 1 日凌晨之間，於高雄市前鎮區與苓雅區的三多一路、三多二路、凱旋三路、一心一路等多條重要道路的連環火災爆炸案，計造成 32 人死亡(含 5 名警消人員、2 名義消人員)、321 人受傷。事後調查發現馬路下排水箱涵內之 4 吋丙烯輸送管線，因長期使用下，因銹蝕致管壁減薄後，無法承受輸送管內的壓力致有破損，管內原作為化工原料之液態丙烯外洩導致氣化飄散逸出，故民眾已於 7 月 31 日晚間 21 時許即陸續通報疑似有瓦斯(氣味)洩漏之情事，但因未確認何種氣體，致無法阻斷輸送管線，故於 23 時 55 分之後，陸續發生多起連環氣爆火災，這案件也引起社會對化災事故的重視，因為，化災事故，不會再僅是環境污染，更是伴隨火災爆炸的嚴重後果。因此，為了保護消防人員自身的安全，也為了在化學災害初期能有立即的正確應變處理措施，政府部門也重視並提昇專業訓練之強度及頻率，以面臨各種突發危害的環境。

美國政府部門的編制與我國不盡相同，但消防隊亦配合化災應變應配備的處理危險化學物質的設備，並依災害狀況之不同，依職責處理封鎖和清除化學溢出、泄漏和其他類型的化學事故，亦包括化學物質造成火災事故之處理，且化災應變隊也會提供簡易醫療、治療等給受化學物質污染、影響的人員，且該隊通常由消防人員、醫護人員和危險化學物質專家等專業人員組成，而德州農工大學人員辦理 Hotzone Conference 研討會的目的，則是提供應化災應變隊、消防、救護、化學專家等人員專業議題之訓練、經驗分享及跨領域交流的機會，也藉以提昇從業人員毒災、化災應變之實務技術與能力。

化學災害的管制區域係視災害情況，分為熱區(Hotzone)、暖區(warmzone)及冷區(coolzone)等 3 區，化學應變隊處理的即為事故區的核心，即為污染的中心、最危險的區域，因此，化災應變隊於熱區(Hotzone)的處理步驟等措施，會影響之後事故的影響程度、範圍區域等。而 Hotzone Conference 研討會係以聯邦第 6 區（以德克薩

斯州、阿肯色州、俄克拉荷馬州、路易斯安那州、新墨西哥州等地區）為對象，雖可以說是地區性的，但與會的人員來自多個國家，依其研討會之會議內容，亦屬國際研討會每年度針對第一線化災應變人員訓練議題作探討，並提供訓練新知，並促進公部門及私部門消防人員經驗、技術之交流；但這幾年，全世界因為嚴重特殊傳染性肺炎（COVID-19)的影響，許多國際交流活動均被迫暫停，終於在疫情趨緩的今年再次辦理，研討會中並呈現這些年所累積的颶風災害、洩漏事故、靜電事故、運輸時車禍火災、化工廠火災等各種類型之化災案例，並經由化學災害搶救案例的說明，將化學物質會產生的災害連鎖應效，以新知、心得發表、經驗交流的方式，提供給參與研討會人員深入瞭解，以為預防。

另外，消防化災應變人員是處理各種化學、火災害現場最寶貴的資源，因為設備可，是否曾具有處理同類事故的經驗或概念時，往往會影響災害現場被解決的時間，及是否會造成災害的擴大，因此化災應變人員會自我充實相關的專業技術與能力，自主性的參加工作相關的研討會，以增加相關的經驗。而且，當救災人員長時間精神緊繃時，往往會對身體免疫系統造成失調的情形，且消防人員在長期面對各種災害現場、殘破的屍體後，造成心理上不可抹滅的陰影時(即創傷後壓力症候群(posttraumatic stress disorder)，簡稱 PTSD)，在在均會影響消防救災人員的正常生活，則家人如何陪伴、如何過正常的生活，亦有救災人員分享如何他的心歷路程，這也是在這次研討會時，另一大收獲。

本次參加研討會的最大收獲是了解到在面臨災害現場時，參與的應變人員除了具有專業技術與能力之外，更應有良好的心理建設，因為，在面臨未知災害現場時，每項處理步驟都是關鍵，也是不容失誤的。

貳、過程

出國日期：111 年 10 月 15 日至 111 年 10 月 26 日。

出國人員：行政院環境保護署毒物及化學物質局張家銓視察、北區毒災應變隊 3 人、中區毒災應變隊 1 人、南區毒災應變隊 5 人及本署訓練中心周鴻呈科長等 11 人同行；本次參訪及參加研討會之行程，係由南區毒災應變諮詢中心協助規劃及安排。

台灣日期	工 作 內 容 概 要
111.10.15	自臺灣啟程，出發至美國德州休士頓市。 自桃園國際機場搭機至喬治布希洲際機場
111.10.16	整理參訪和研討會資料、聯繫參訪事宜
111.10.17	前往德州農工大學，準備德州農工大學 TEEX 的參訪資料，聯繫參訪事宜
111.10.18~ 111.10.19	參訪德州農工大學工程服務中心(TEEX） 1. 參訪緊急應變訓練中心 (Emergency Operations Training Center)，主要對各類大型災害之指揮層級進行模擬訓練設施。 2. 參訪各類消防火災訓練模組以及訓練用廢水之回收處理設備
111.10.20	前往休士頓市區 Wyndham Houston Hotel，並準備 Hotzone Conference 研討會
111.10.21～ 111.10.24	參加 2022 Hotzone Conference 研討會，並與出席消防、火災、救災等相關單位人員交流（同時間多議程分別於會議室舉行）。
111.10.25～ 111.10.26	1. 拜訪休士頓消防化災應變隊 2. 返程(自休士頓喬治布希洲際機場搭機)，返回台灣桃園國際機場

參、心得

一、TEEX 的參訪

美國德州農工大學（Texas A&M University）位於美國德克薩斯州大學城，創於 1876 年，後於 1929 年被德州政府選定為國土安全訓練機構，並建置相關訓練設施，統稱為德州工程推廣服務及事業(Texas Engineering Extension Service)，簡稱 TEEX。自 1998 年後，TEEX 一直為美國國土安全領域培訓人員，另城市搜救部隊(負責倒塌建築物內搜救，包括地震倒塌、破壞、支撐、脫困、重物搬移等)也位於此機構內，準備在災難發生時立即出發救援。現今 TEEX 每年為美國境內各州政府位及全球 80 多個國家提供緊急應變、國土安全、工作培訓、消防技術指導及訓練等服務工作。並可依不同單位之需求量身訂做相關課程，制訂培訓和訓練項目，以滿足不同需求之企業客戶及政府部門。

TEEX 位於德州農工大學西南方約 10 分鐘車程，佔地約 62 公頃，內部設施分為 4 大區域，略述如下：

(一)Brayton Fire Training Field(布雷頓消防訓練場火災訓練場)：設有 132 項特殊訓練場所，涵蓋消防火災搶救、倒塌建物搜救、危險化學物品應變、海域搜救及應變管理訓練等課程。

(二)緊急應變訓練中心(Emergency Operations Training Center)：運用特殊電腦系統模擬各種大型災害現場情境，訓練學員及指揮官之指揮、管理能力。

(三)Disaster City(災難城市)：模擬都市建築物倒塌現場搜救之訓練基地，教授各種災爆炸現場、倒塌建物救災所需之緊急專業技術及技巧。

(四)EMS Lab(緊急醫療救護實驗室)：提供化學災害、毒性物質之特殊醫療訓練，參訓人員會依據數種不同情境、被害人徵狀等情形做評估後，採取恰當之緊急醫療措施。

TEEX 布雷頓消防訓練場之區域內各種訓練設施之分佈平面圖。

以下為參訪 TEEX 心得分享：

(一)TEEX 的火災模擬設施：

TEEX 場內的火災模擬訓練場區係依建築物、船隻、航空器等場景內部情形規劃設置，另再依據實際事故案例設計訓練課程內容，更有將事故當下發生的相關設施保留，並移至訓練場區內改造、供訓練之用，有效增加學員對於災害事故臨場震撼感及提升訓練成效。設施點火時，係由消防人員先開啟燃氣管線後，再由消防人員前去點火，相關燃燒之訓練設施已建有一段時日，但每日均有不同班期之訓練團隊，使用頻繁。

(二)緊急應變訓練中心(Emergency Operations Training Center)有跨政府部門的應

變指揮系統，因為在面臨大型災害事件時，要能有立即性、有效率的整合不同部間的資源，另受理美國其他州政府派員的指揮官訓練，亦有聯邦政府要求相關機關派員參加的反恐應變訓練。該中心亦可客制化參訓練團體之需求安排訓練，事先會先調查參訓單位曾發生過、有可能面臨的各種災害案例，並再深入分析災害因子，以數據分析、模擬可能發生事故之情境，並以案例研討方式讓學員進行討論，並包括指揮組、應變組、後勤組及財務組，以建立各組之間的合作模式，並依時序發展，下達不同之狀況情境，使訓練貼近真實狀況，有效提升訓練之實用性。且該中心訓練場內並有監視器及麥克風等設備，可供參訓人員於訓練後自我檢視訓練過程中的缺失，自我發掘問題後，有助提昇訓練成效。

(三)TEEX 對於相關緊急應變處理的教育訓練，具有專業性、嚴謹性及標準作業程序，包含訓場各式災害場景的構建、各種複合式災害情境的模擬、訓練教材等，訓練內容包括模擬化學物質災害應變外，另包括森林火災、工廠火災等各種樣態之火災災害、地震災害、恐怖炸彈攻擊等災害之情境模擬，讓參與人員係彷彿實際參與該災害事件當中，大幅強化受訓人員的專業知識與技能；我國訓練場景亦不輸 TEEX 場地之設備，但可再提昇訓練教材之內容、操作流程等項目，且 TEEX 係採開放的作法，不同國家、訓練單位亦可引進該訓練教材、訓練模式後，即可取得認證，若係個人前來 TEEX 訓練，則訓練課程亦會依 NFPA 相關規範，並頒予參訓人員相關合格證書，國際化的訓練證書是專業人員的共同語言，為於災害現場能有效率的進行救災、應變，國際化的認證是務必要進行的。

(四)火災訓練場區每天的訓練用水量可高達數千加侖，為了減少水資源的浪費，並循環利用水資源，TEEX 的訓練場區內設有廢水回收處理系統，除可有效回收訓練用廢水再利用外，另針對使用化學泡沫搶救訓練之課程，另外設置泡沫水溶液處理系統，以有效去除化學泡沫，增加回收水的效率，此作法亦可做為未來國內災害搶救訓練場地建置、改善時參考，避免訓練用水之浪費。

於參訪時與 TEEX 職員合影。

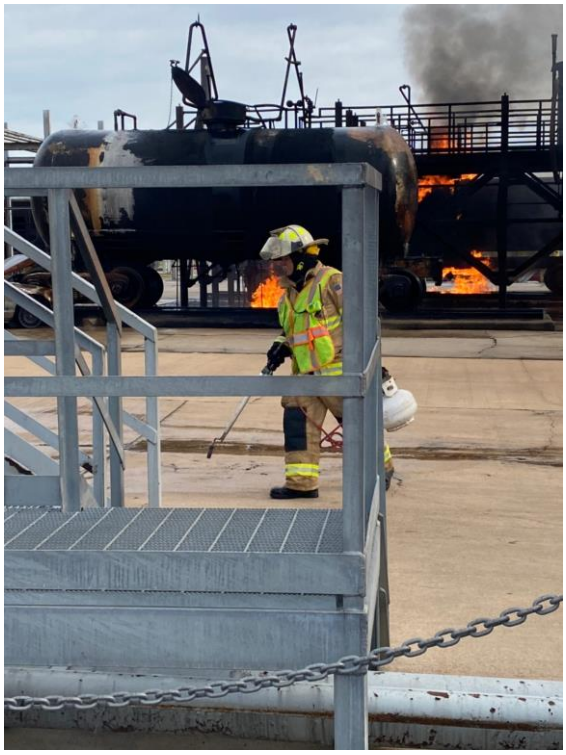
TEEX 人員簡報營運情形。

TEEX 人員介紹說明。

TEEX 訓練廠區內之風雨教室。

TEEX 的訓練場區建置之廢水回收處理系統。

TEEX 的訓練場新建教室之工程。



參訪時，TEEX 正在進行火災搶救訓練。

右為參訪人員於緊急應變訓練中心前合影；左為職員介紹訓練中心運作情形。

緊急應變訓練中心教室內之場景，依不同組別給予不同顏色，以利參訓人員有效分辨組別及任務。

模擬發佈重大災害事故記者會之場景，讓參訓學員在面對大批媒體時，如何面對壓力，並訓練最佳的應對方式。

二、研討會參與心得

Hotzone Conference 研討會是地區性的化學災害緊急應變處理研討會，以聯邦第 6 區（以德克薩斯州、阿肯色州、俄克拉荷馬州、路易斯安那州、新墨西哥州等地區）為承辦單位，但亦會有來自其他國家消防化災人員參加，每年度針對第一線化災應變人員訓練議題作探討，並提供訓練新知，參加研討會人員計有消防人員、化工廠人員、化災應變人員、保險公司人員、緊急救護人員，並促進公部門及私部門相關人員經驗、技術之交流，本次研討會係於 Wyndham Houston Hotel 舉辦，但並無大眾交通公具可抵達，與會人員則係從美國其他州來參加，要透過租車才有辦法由機場抵達，還好內部餐廳供餐，研討會之期間可以不用外出。

國內在研討會或化學物質危害特性之教學時，往往藉由文字、照片或影片等方式讓參加人員瞭解這方面的知識；但國外講師則直接於現場，透過小型教具模型，實際展示化學物質的物性、化性及所產生的危害性，並讓學員操作偵測時使用的儀器，再

輔以口頭解說，這種身歷其境、實際操作的教學方式，著實讓學員有更深刻的印象與瞭解，研討會的訓練方式值得國內參考學習。

由於化學品的種類發展日新月異，美國近幾年已開始重視危險品指揮官(HazMat Officer)的教育訓練，提醒危險品指揮官要有專業能力外，亦應保持謙虛心態，不斷精進學習，並保有熱情、幽默等特質，可以傾聽隊員反應的意見、信任隊員的應變能力，平時亦訂有相關指引及檢核表提供危險品指揮官閱、參考，以助於面臨處理危險品災害現場時，指揮官能更有效率的交接任務，此作法亦值得我國參考與學習。哈里斯郡消防隊長辦公室(HCFMO,Harris County Fire Marshal's Office)分享其內部應變人員教育訓練教材及能力檢核表，內容相當完整，甚至包含應變人員穿著防護衣駕駛堆高機等，處理化學危險物品的訓練，檢附取得的訓練教材供國內參考。

研討會報到的櫃台，全全美州各地前來參加的人員，分別在此領取識別證及會議資料。

與研討會講師合影。

研討會講師之實務操作授課情形。

研討會之授課情形。

對於化學災害事故現場，若已引起火災，則當以控制火災為主，以避免災害擴大，若僅是化學品洩漏，則其處理程序分為初期危害評估、除污程序，說明如下：

(一)初期危害評估

目前應變人員所學習的危害辨識，主要是集中在觀察、收集鋼瓶外部的標示內容，但往往某些狀況之下無法取得資訊，例如容器外部鏽蝕嚴重，或容器外部無明顯標示內容，而研討會課程中講師示範如何從殘缺的標示、數字、象徵符號、鋼瓶顏色、鋼瓶大小形式、瓶閥的種類、洩壓閥的類型、氣體出口閥的樣式等資訊，逐步分析鋼瓶內可能裝填的物質，其分的專業知識、方法與經驗，值得我國化災應變人員學習。

HazMat IQ 公司分享該公司對於危險品危害評估系統圖表，將複雜的化學概念簡單化，讓應變人員能夠對危險品快速進行風險評估，提供應變人員對於隔離距離、適當的個人防護設備(PPE)和檢監測設備的依據，並做出應變處理的決策，包括進行危險品救援行動、識別不安全的大氣/環境，以及識別未知化學品，如果搭配其他系統與參考資料（如 ERG、SDS、NIOSH Guide to chemical Hazards），對危險品事故應變處理上，則更有助益。

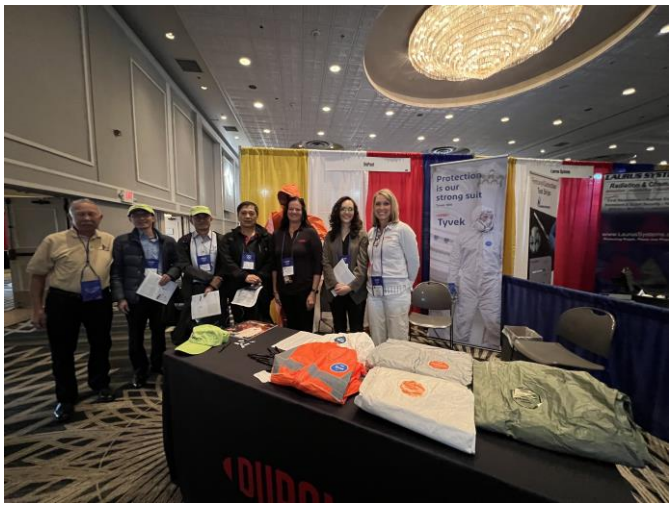
(二)除污程序

針對化學品事故現場不同的化學品種類，又因不同的環境條件，故美國各州會採取不同的應變方法，會中講者特別介紹一款免費的除污現場指南(Decon Field Guide)APP，此 APP 是專門為危險品專業人員設計，透過輸入化學品名稱或 CAS Number 進行搜尋，可快速、有效地評估常見的威脅，並提供有關正確除污方法說明，值得國內參考使用。

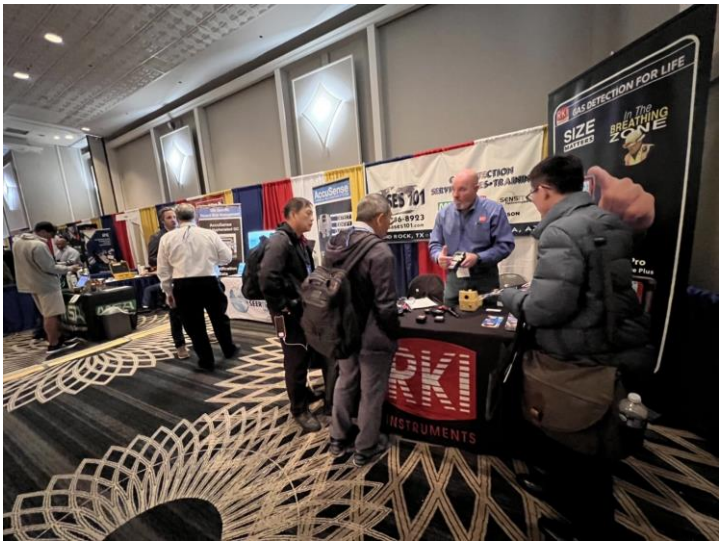
美國對於化學品危害之除污方式可分為濕式及乾式 2 類，研討會中分享許多濕式及乾式除污經驗及案例，相較目前國內較少使用乾式除污方式，對於乾式除污方式也較不熟悉，且部分除污產品在國內也無法取得，然而濕式及乾式除污各有其優缺點，未來國內亦可依化學物質之種類多方嘗試，以提昇效率。

研討會中亦有討論電動車火災的主題，參加人員擠滿會議室，因為日後全球節能減碳的趨勢，係以電動車取代燃油車，以大幅減少石油的使用。但電動車為新興產業及技術，目前電動車滅火的消防標準尚在研議，電動車火災後且亦容易產生結合電氣及火災之複合性災害，增加消防人員搶救之困難度及危險性急，透過研討課程瞭解到電池基本介紹及災害危害特性，並提供目前電動車最新之滅火消防策略參考。

研討會另設有展示各種災害處理設備、器材之展示攤位，由各家業者提供最新軟體、設備及教育訓練等資訊，可供國內引進、購置設備、器材時參考，對於新技術引進或開發符合本土化設備或軟體，都甚有其助益。



研討會場的設備、器材展示攤位，陳列出目前最新的設備及器材。



研討會場的設備、器材展示攤位，陳列出目前最新、且可攜至災害現場的檢測分析設備及器材。

三、休士頓化災應變隊參訪心得

休士頓所在地約有 1694 平方公里，以面積而言是美國的第四大的城市，人口數約 210 萬，因區域內化學工廠和冶煉廠比世界他地方都要來得集中，故白天加上外地來此的勞工，人口數可達 420 萬人以上，故亦被稱為“世界石化之都”。而潛在的危害因素包括石油公司相關設備的儲罐、天然氣井、氨(Ammonia)製造廠、硫酸回收廠、乙炔純化設備等，而區域內的醫療中心及許多小型工廠，較常使用的氯氣、液化石油氣(LPG)、氨、硫酸、漂白劑、鋅和可燃金屬等化學品。因轄內具有如此特殊的產業，因此，休士頓消防局在 1979 年 10 月成立了化災應變隊(Houston Fire Department Hazardous Materials Response Team，簡稱 HMRT)，化災應變隊的主要目標為去除危害物質對環境或人員所造成的影響及潛在風險，包括災害現場風險評估、搜救、危害物質洩漏辨識及採樣分析、環境污染監控、化學品洩漏事件之止漏、工業有害物質事故處理、排放空氣中之有害物質投訴、恐怖攻擊事件處理、槽車翻覆處理、載送化學品火車脫軌事件處理等，並於危害物質的洩漏或事故做出應變、環境檢測、災後復原

等處理，並提供廠商於事件處事之專業知識和技術指導。

本次參訪的休士頓消防局的訓練中心(VAL JAHNKE TRAINING FACILITY)係位於休士頓市區的東南部的霍比機場(Hobby Airport)附近，面積約 17 公頃，內部設施包括火災搶救戰略模擬設施、火災搶救演練之建築物、高樓作業操作鑽塔、XFB(Extreme Fire Behavior)極端火災行為之建築，另有 15 間室內之消防員訓練教室，係休士頓消防局新晉用消防人員的第 1 個訓練基地，辦公室的走廊更陳列出歷年來因公出勤而殉職的消防人員相片，下方說明該殉職人員的英勇事蹟。我覺得這是對殉職人員的紀念，但另一方面，這亦是要提醒新晉用的消防同仁，消防工作除了要有熱忱、專業訓練外，亦不能有一絲、一毫的鬆懈，否則就會成為往事了。

參訪訓練中心(VAL JAHNKE TRAINING FACILITY)心得分享：

(一)休士頓市化災應變隊在過往事故中的職責與其對於事故的處理方式，並已在昔日的案例中獲得寶貴的經驗，且事後會針對處理方法進行檢討，未來若遭遇同類型的事故，則係建立一套標準處理程序，再依個案情形調整，此作法應可供我們處理案件方向時參考。

(二)該訓練中心內之化學品緊急應變處理車，由外觀看似同一般的消防車，但車輛上所有的空間均充分使用，內配備有多項化學儀器、偵測配備、化學品洩漏應變器具、吸附及處理藥劑、使用手冊等，故已涵蓋可以處理一般性常見化學物質的器材及藥劑，且可以配備轄區內常見的化學物質，與我國的不盡相同，亦可供我們借鏡。

消防人員解說化災應變車上裝備、器材時，展示了標準配備之多樣性，包含用攜帶型偵測器(含配備之管線、零件及耗材)、化學藥劑等，期於化災現場可依不同的事故，找到最適合之裝備器材進行處理，且化學藥劑及耗材均會定期盤點，避免過期而失效；另車輛空間使用之嚴謹性亦值得學習，消防常用的斧頭等破壞器材及常用的機械工具均有收納空間，增加了化災應變車用途的多元性；另

化災應變車亦建置資訊整合室，可供帶隊官或聯絡官在排除外界吵雜之環境下，進行相關指令之下達、資料之紀錄與回報等。而使用過的化學藥劑等耗材，係不可棄置於災害現場，該車亦有放置的空間，以利於返隊後一併處理。

(三)休士頓化災應變隊之室內訓練場、教室中，另有針對現場指揮官之專業訓練設計，透過不同之情景的布置，其係以隔板區分出指揮官的小空間，訓練教官下達不同火災、化災資訊後，各分區指揮官分別以無線電、電腦螢幕互相分享所面臨的災害現場資訊、線上討論後，要還原出災害現場之完整全貌，模擬指揮官於事故現場做出決策之臨場感；此訓練方式可提供國內救災單位訓練時參考，因為要模擬事件的情況下，分區指揮官提供不同的資訊給指揮官綜合研判。因為當決策錯誤時，是會造成消防人員嚴重傷亡的結果！因此，指揮官平時要訓練具有正確判斷火災、化災災害現場狀況的能力，並採取正確的應變措施。

(四)休士頓消防局的訓練中心(VAL JAHNKE TRAINING FACILITY)供火災搶救、救護、災害救援和其他相關緊急救援，感覺上是縮小版的 TEEX，建置消防基礎火災搶救訓練相關設備，包括建築物、船舶等場景，亦有各種化災事故處理、緊急救護的專業訓練內容，雖然沒有 TEEX 設備的種類繁多，但亦已提供初任消防員應具備的相關基礎訓練，這情形與我國縣市政府消防局自辦消防訓練中心的設計規劃內容相似，但因為休士頓消防局編制之新晉用的消防員及定期召回訓練的量能較大，故訓練情形。

參訪休士頓消防局的 VAL JAHNKE TRAINING FACILITY 的情形。

消防化災應變人員解說化災車輛上的裝備及器材。

VAL JAHNKE TRAINING FACILITY 辦公室陳列殉職人員的相片及英勇事蹟。

肆、結論與建議事項

本次囿於時間關係，拜會參訪的地方時間短暫，但已儘力蒐集參訪單位的資料，日後若能有較長時間深入瞭解，應可發掘出這些參訪單位更詳細的優點，綜合出更好的建議，本次參訪及參加研討會的心得，茲建議如下：

(一)消防訓練設施環境之更新改善：

德州農工大學之 TEEX 訓練場地之設施，係依實際尺寸及結構建造，藉由建築物、運輸槽車、船舶、航空器等設備來模擬實際的洩漏情境進行訓練，透過真實的訓練場地，使參訓人員在訓練過程中與實務結合以加深印象；與本署訓練中心之情境相似，且本署訓練中心使用的點火設備是機械點火，比 TEEX 的人工手動點火更為精確，並可以控製、製造不同的情境火災，不遜色於 TEEX 的訓練場所設備，且在往返 TEEX 的途中，由遠處即可見 TEEX 訓練場上空燃燒不完全所造成的濃煙，而本中心燃燒係使用丙烷氣體，依氣體燃燒之特性並不會有燃燒不完全的情形,是以本中心火訓練火點對環境的影響較輕微。

另外，TEEX 訓練場及模點火點週圍均設有集水溝渠等設施，其目的係回收訓練之廢水、泡沫等溶液，訓練用之廢水於訓練後會回流至溝渠中，集中至汙水處理系統，經過三個步驟:污水預處理、生物處理和化學/物理處理，污水預處理通常包括去除大顆雜物，生物處理包括利用微生物將有機物分解，化學/物理處理包括使用化學藥劑或物理方法將雜質從水中分離，經過這個過濾、沉降、滴濾池、曝氣、消毒等程序後，再回收使用，以落實環保概念，避免消防化學泡沫對環境造成污染，可供本署訓練中心日後規劃環境設備改善時之參考。

訓練設施使用一段時間後，會有損壞、故障的情形發生，因為 EEX 訓練場接受國內、國外單位的消防火災搶救訓練，故訓練人員多、使用頻率高的結果下，再加上設備已購置一段時間，自然要加強保養、維修工作，這也是本署訓練中心日後會面臨的問題，故對個人使用之消防衣等品項採用租賃方式，承商平時則應負責維護，如此可以節省維護費用；另對於消防模擬設備及器材，則應採用原廠保固、系統升級、更新的方式，更可

以確保相關設備的正常狀態。

(二)國際訓練材本土化並取得國際認證：

本署訓練中心園區面積是亞洲最大之訓練基地，目前國立高雄科技大學承接行政院環境保護署毒物及化學物質局的委託專案，於該校內成立南區毒化災專業訓練中心，因該校長時間持續派員至德州農工大學 TEEX 接受訓練，前於 110 年間更請 TEEX 訓練教官來臺辦理毒化災應變之教育訓練，故與 TEEX 簽署合作協議(MOU)，成為 TEEX 在臺灣的的毒化災訓練合作學習中心。惟美國國家消防組織聯合委員會（Joint Council of National Fire Service Organizations，Joint Council）國家專業資格委員會 National Professional Qualifications Board（以下簡稱 Pro Board）係消防最高的認證的訓練單位。

為了研議消防員的培訓標準，Pro Board 與美國國家消防協會 National Fire Protection Association（以下簡稱 NFPA）合作建立「共識技術委員會」，製定明確的消防人員培訓認證過程及制定消防職業能力(消防訓練、搶救訓練、急救訓練及危害物質處理訓練…)的基本標準，並對符合該標準的消防部門進行認證，且通過認證者，即成為 Pro Board 認證之培訓證機構，而於該認證培訓機構訓練及測試結束合格之消防員，則由培訓機構頒發給個人 Pro Board 證書，並登錄於 Pro Board 國家專業認證系統內，作為個人職業能力之認證，並可受聘於美國跨州或不同區域的消防機關，以避免於美國不同州或區域之消防訓練機構不同，造成消防人員因訓練方式及標準不同，而造成能力不同的狀況。

目前 Pro Board 認證標準已經執行多年，認證標準已通用於全美境內，對象為消防機關部門的職員、義消人員，課程項目為 NFPA 所制定之標準，包括 NFPA CODE 472、473、1001、1002、1003、1005、1033…等多種。本署訓練中心已委託國立雲林科技大學針對化災應變處理標準 NFPA 472 進行中文化，並進行評估、規劃引進 Pro Board 認證標準，而並依照其規範制定之程序，提出相關申請資料，正與 Pro Board 洽談認證計劃，以期將我國化學災害應變之訓練課程教材內容及消防員的技能與國際接軌，並提供給我國消防員訓練用，提昇消防化災應變處理之技能，將化學物質災情降至最低。

(三)辦理分享案例及經驗之化災應變研討會：

化學災害是我國不可忽視的潛在風險，因為我國科學園區、工業區內，均有化學品使用量不等的需求，而化學物質的危險性，從化學品被製造後就開始累積不安定的能量了，不論是運送途中、貯存、當製造之觸媒、合成原料等，均有可能釋放能量產生失控反應。Hotzone Conference 研討會的目的是蒐集來自不同地區的消防化災應變人員、化學者及化學品專家的案例經驗，經由研討會的形式提供與會者討論、經驗交流。本署為強化消防機關消防人員化學災害〈含核生化災害初期防護〉搶救基本認知及裝備器材使用操作知能，訂頒化災搶救基礎班訓練、化災搶救進階班訓練，以維消防人員執行化災搶救之火災滅火及人命救助任務安全，但對於火災案例的部份，卻是分散在不同的業務系統中，因此，應配合化災案例辦理相關的研討會，提供相關知識、經驗，以期日後消防人員於面臨複雜的複合性化學物質災害現場時，有利於立即採取正確之應變措施，才能在化災發生時將傷害降到最低。

伍、附錄：

一、研討會手冊

2022 HOTZONE

Training for Responders by Responders

Wyndham NRG – Medical Center

8686 Kirby Drive
Houston, TX 77054
Phone:(713) 748-3221
Fax: (713) 795-8492

OCTOBER 20 – 23, 2022

WYNDHAM

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Hotzone 2022
Event Schedule

Wednesday, October 19, 2022

Registration Hotzone Registration Desk area	1600 - 2000

Thursday, October 20, 2022

Registration	0700 – 1200
Coffee and Juice	0700 - 0800
Classes – Session Code A	0800 - 0930
Morning Break	0930 – 1000
Classes Resume – Session Code A	1000 - 1130
Lunch (on your own)	1130 – 1300
Classes – Session Code B	1300 – 1430
Vendor Set-up	1300 - 1800
Afternoon Break	1430 - 1500
Classes Resume – Session Code B	1500 - 1630
Dinner Break **(on your own)**	1630

Friday, October 21, 2022

Exhibit Hall opens	0700
Coffee and Juice in Exhibit Hall	0700 – 0800
Outside Exhibits	0700 - 1700
Opening Welcome and Keynote in Sam Houston Ballroom	0800 - 1000
Morning Break in Exhibit Hall	1000 – 1015
Class C – Keynote Session by in Sam Houston Ballroom	1015 - 1145
Lunch (on your own)	1145 – 1300
Classes – Session Code D	1300 - 1430
Static Display outside	1130 – 1700
Afternoon Break – Exhibit Hall	1430 – 1500
Classes – Session Code E	1500 - 1630
Reception in the Rio Lounge	1800 – 2200

Saturday, October 22, 2022

Exhibit Hall opens	0700
Coffee and Juice in Exhibit Hall	0700 – 0800
Outside Exhibits	0700 - 1200
Classes – Session Code F	0800 - 0930
Morning Break in Exhibit Hall	0930 – 1000
Classes – Session Code G	1000 - 1130
Lunch (on your own)	1130 – 1300
Exhibit Hall Closes	1200
Classes – Session Code H	1300 - 1430
Afternoon Break – Hotzone Registration Area	1430 – 1500
Classes – Session Code J	1500 - 1630
Classes End	1630
HotZone Dinner (provided) and Awards in the Sam Houston Ballroom	1830 – 2200

Sunday, October 23, 2022

Coffee and Juice in Hotzone Registration Area	0730 – 0900
Closing Keynote – in the Sam Houston Ballroom	0900 - 1000
Morning Break in Hotzone Registration Area	1000 – 1015
Closing Ceremonies and Door Prizes	1015 – 1130

SEE YOU NEXT YEAR

HOTZONE Schedule at a Glance

THURSDAY, OCTOBER 20										
Room	**San Jacinto 1**	**San Jacinto 2**	**San Jacinto 3**	**San Jacinto 4**	**San Jacinto 5**	**Off Site**	**Off Site**	**Off Site**	**Off Site**	**Off Site**
0800 - 1130	A1: Risk-Based Response Escape Room - 4 Hours (Donohue, Mussorfiti, Byrnes) **Seating Limited to 25**	A2: Risk-Based Response Escape Room - 4 Hours (Donohue, Mussorfiti, Byrnes) **Seating Limited to 25**	A3: Chem-Bio Response IQ - Responder Centric Risk-Based Response (Federal Resources Team) **Seating Limited to 30**	A4: Tactical Chemistry - Classroom (Dufek, Weber) ✓	A5: Field Identification Laboratory - Heinz 5-Step Method (B. Heinz) **Seating Limited to 30**	A6: Your HazMat Backup Team is not a RIT Classroom and hands-on at the HFD Training Academy (Emery, Zientek, Wiseman) **Seating Limited to 25**	A7: Chemical & Physical Properties for Risk-Based Response - Interactive Class (Ramsey, Harris County HazMat, Jason Barnes) **Seating Limited to 25**	A8: Houston Petrochemical/Industrial Marine Tour. Starts in the Classroom then interactive. (Hand, Lawhorn) **Seating Limited to 25**	A9: Product Control and Transfer-Hands-on at the HFD Training Academy (McClain & Houston HazMat) **Seating Limited to 25**	A10: Emergncy Response to Ethanol Incidents (Frost, Rudner, and the Woodlands HazMat Team) **Seating Limited to 25**
1130 - 1300	**Lunch Break - On Your Own in Rio Lobby**									
1300 - 1630	B1: Greater Harris County LEPC Meeting	**Open Room**	B3: Chem-Bio Response IQ - Responder Centric Risk-Based Response	B4: Tactical Chemistry - Classroom (Dufek, Weber) ✓	B5: Field Identification Laboratory - Heinz 5-Step Method	B6: Your HazMat Backup Team is not a RIT Classroom and hands-on at the HFD Training Academy	B7: Chemical & Physical Properties for Risk-Based Response - Interactive Class	B8: Houston Petrochemical/Industrial Marine Tour. Starts in the Classroom then interactive	B9: Product Control and Transfer-Hands-on at the HFD Training Academy	B10: Emergncy Response to Ethanol Incidents
1630	**Dinner On Your Own**									
FRIDAY, OCTOBER 21										
	Opening Ceremonies - Sam Houston Ballroom									
0800 - 1000	**What's YOUR Career Incident** ✓ **Rodney Reed & Bob Royall**									
1000 - 1015	**Break**									
1015 - 1145	**Randy's Story: How an Accident IMPACTS More Than Just You** ✓ **Randy Royall**									
1145-1300	**Lunch Break - On Your Own in Rio Lobby**									
Room	**San Jacinto 1**	**San Jacinto 2**	**San Jacinto 3**	**San Jacinto 4**	**San Jacinto 5**	**San Jacinto 6**	**Alamo 1**	**Alamo 2**	**Alamo 3**	**Gulf Coast 1**
1300-1430	D1:Industrial Disasters from Natural to Man-made (Silverman, Scheibe) **Part 1 of 2**	D2:HazMat by the Numbers (Hawley)	D3: Liquid Oxygen Reactivity & Mechanical Impact (Byrnes) ✓	D4: HazMat Headlines (Murphy, Bevelacqua)	D5: Advanced IQ-Beyond Red 1: Identifying the Unknown (Federal Resources Team)	D6: Bad Weather/Winter is Coming (Sloan)	D7: Emerging Threats (Baxter)	D8: Incident Response Tools for Everyday HM Calls (Spasev, Housley) **Part 1 of 2**	D9: GIS-It's Not Just for Geeks and Models (Valerioti, Bradley) **Part 1 of 2**	D10: Street Smart HazMat Safety Officer (Callan) **Part 1 of 2**
1430 - 1500	**Break in Exhibit Hall**									
1500 -1630	E1:Industrial Disasters from Natural to Man-made (Silverman, Scheibe) **Part 2 of 2**	E2: Decontamination Techniques and Procedures (6th WMD-CST)	E3: Compressed Gas Emergency Response Fundamentals (Ngai)	E4: Combatting EV and Battery Fires (Fowler, Kelly)	E5: Put It Out or Let It Burn (Meehan) ✓	E6: What Do You Know? The HazMat Quiz Show (Donohue)	E7:Not Just Another Gas Leak (Janke, Hageman)	E8: Incident Response Tools for Everyday HM Calls - (Spasev, Housley) **Part 2 of 2**	E9: GIS-It's Not Just for Geeks and Models (Valerioti, Bradley) **Part 2 of 2**	E10: Street Smart HazMat Safety Officer (Callan) **Part 2 of 2**
1630 - 1900	**Exhibit Hall Open**									
1800 - 2200	**HOTZONE Reception**									

HOTZONE Schedule at a Glance

SATURDAY, OCTOBER 22										
Room	**San Jacinto 1**	**San Jacinto 2**	**San Jacinto 3**	**San Jacinto 4**	**San Jacinto 5**	**San Jacinto 6**	**Alamo 1**	**Alamo 2**	**Alamo 3**	**Gulf Coast 1**
0800 - 0930	F1: The Heat is On (Crockett)	F2: So You're the New HazMat Officer, Now What? (Hayes)	F3: Creating the Incident Action Plans/Support Operations & Recovery (Donohue) **Part 1 of 2**	F4:Clandestine Drug Labs Case Studies (Wilson, TxDPS CID)	F5:Common Sense.. Isn't (Lewis)	F6: Railway Disasters (Byrnes) **Part 1 of 2**	F7: What's in the Cylinder (Ngai)	F8:Applying FTIR to ID Unknown Gases & Vapors (Cornish)	F9: Unstable Materials, Monomers, and Organic Peroxides (Silverman, Cullen, Callan) **Part 1 of 2** ✓	F10: Field Dectection of Pesticides, Suicides, and Sickness (Weber) **Part 1 of 2**
0930 - 1000	**Break in Exhibit Hall**									
1000 - 1130	G1:HazMat Response to Odors (Hawley)	G2: HazMat Response After the Storm (Socks, Waterfield)	G3: Creating the Incident Action Plans/Support Operations & Recovery (Donohue) **Part 2 of 2**	G4: Oxidizers and Swimming Pool Chemicals (Murdock)	G5:HazMat: Just What Do I Need? (Musserfiti, Royall)	G6: Railway Disasters (Byrnes) **Part 2 of 2**	G7: The New NFPA 470 Standard (3 Part Workshop) (Emery, Zientek, Wiseman) **Part 1 of 3**	G8:Decon Selection (Baxter)	G9: Unstable Materials, Monomers, and Organic Peroxides (Silverman, Cullen, Callan) **Part 2 of 2** ✓	G10: Field Dectection of Pesticides, Suicides, and Sickness (Weber) **Part 2 of 2**
1130 - 1300	**Lunch Break - On Your Own in Rio Lobby**									
1300 - 1430	H1: The Kobayashi Maru (Murphy, Bevelacqua)	H2: Put it Out or Let it Burn (Meehan) **2nd Offering**	H3: Developing Tactical Worksheets/Risk-Based Approach (Byrnes, Musorfiti)	H4: Training the New HazMat Technician 2.0 (Hayes)	H5:The Colorimetric Conundrum (Hawley)	H6: Inside the fenceline: Response to Emergencies at Chemical Facilities (Silverman, Cullen) **Part 1 of 2**	H7: The New NFPA 470 Standard (3 Part Workshop) (Emery, Zientek, Wiseman) **Part 2 of 3**	H8: Hold My Matches and Watch This (Ramsey) **Part 1 of 2**	H9:Utilities IDLH (Immediately Dangerous to Life & Health) (Callan)	H10 Battery & Stored Energy Emergencies (Baxter)
1430 - 1500	**Break in Ballroom Foyer**									
1500 - 1630	J1:Confined Space: HazMat or Rescue (Lewis)	J2: Thermal Imaging Camera (Safety for Firefighters) (Crockett)	J3: Back to the Basics Air Monitoring (Janke, Hageman)	J4: First-in Hazmat Size-up (Fowler)	J5: All Hands on Deck! How to Manage the Never-ending HM Team Logistics (Spasov, Housley)	J6: Inside the fenceline: Response to Emergencies at Chemical Facilities (Silverman, Cullen) **Part 2 of 2**	J7:The New NFPA 470 Standard (3 Part Workshop) (Emery, Zientek, Wiseman) **Part 3 of 3**	J8: Hold My Matches and Watch This (Ramsey) **Part 2 of 2**	J9: LNG Transportation & Response for First Responders (Gorke, Waterfield)	J10: Environmental Crimes Case Studies (Wilson, HPD Environmental Investigations Unit)
1630 - 1830	**Break**									
1830 - 2200	**Dinner and HOTZONE Awards Sam Houston Ballroom**									
SUNDAY, OCTOBER 23										
Closing Ceremonies in Sam Houston Ballroom										
0900 - 1130	**After COVID, Where Do We Go From Here? Mike Callan**									

COURSE DESCRIPTIONS

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二、HCFMO EMERGENCY OPERATIONS FIELD TRAINING MANUAL

LAURIE L. CHRISTENSEN CFPS, FM, FEMT
Harris County Fire Marshal

HCFMO
EMERGENCY OPERATIONS FIELD TRAINING MANUAL

NAME:

Credit to those who created and organized the information contained in this work product by utilizing it to create similar work product for your organization would be appreciated by including the following dedication:

The organization and arrangement of the referenced material in the Harris County Fire Marshal's Office (HCFMO) Emergency Operations Field Training Manual and Position Task Book is the work product of the Harris County Fire Marshal's Office. The HCFMO Field Training Manual and Position Task Book was created and is continually updated by dedicated employees of HCFMO. The creation and organization of this material is to document an individual's successful performance of the required tasks to become an agency-credentialed fire investigator, as well as, demonstrate successful performance of the minimum job performance requirements (JPRs) for HazMat Technicians as outlined in the National Fire Protection Association (NFPA) 470: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Qualifications. Great care was taken to cite all work product of the NFPA. This work product is not intended to be used or reproduced in any commercial capacity for profit or personal gain.

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HCFMO OVERVIEW

Authorized under Chapter 352 of the Local Government Code, The Harris County Fire Marshal's Office (HCFMO) is a specialized law enforcement agency that provides essential public safety services, primarily in the unincorporated areas of Harris County, TX. The HCFMO relies on a customer first operational philosophy to achieve agency goals and balance community risks regarding fire/life safety and emergency response within the 1,777 square miles of Harris County and 4.8 million population; while encouraging a strong and sustainable economy.

The Fire Marshal is appointed by Commissioners Court to a term not to exceed two years. Except for administrative support staff, HCFMO employees are certified as "fire protection personnel" by the Texas Commission on Fire Protection ("TCFP"); and where required by law, as "peace officers" by the Texas Commission on Law Enforcement ("TCOLE").

HCFMO at a Glance

Senior Leadership

Laurie Christensen, Fire Marshal
CFPS, FM, FEMT

Bob Royall	Assistant Chief Emergency Operations
Rodney Reed	Assistant Chief Operational Support
Mitch Weston	Deputy Chief Investigations
Chad Shaw	Deputy Chief Prevention
Established	1974
Major Missions	Fire/Arson Investigation Fire Inspections Code Enforcement Emergency Response Coordination of Fire Protection Services Training and Education Homeland Security Readiness

Total Employees.....100+

Core Values

HCFMO's greatest asset is the men and women who embrace and work by a set of enduring Core Values. These values give each HCFMO member strength and form the basis for every action; they bond each member into the team that will meet and withstand every challenge.

Integrity is the quality that, without compromise, guides HCFMO personnel to act responsibly, to be dependable and responsible, to hold themselves and others accountable for their actions, and to respect others.

Commitment is the total, 24-hour-a-day, dedication to community and the people we serve. It is the bond between all HCFMO members that drives us to complete any mission, to get the job done by sharing the load and looking out for each other.

Excellence is the expected result for all HCFMO activities. It is the driver behind our determination to achieve the highest standards of personal responsibility for excellence in everything we do.

EXECUTIVE SUMMARY

Introduction

As a probationary Hazardous Materials Technician, you have demonstrated the unique skills to work in the field of emergency operations and hazardous materials response. Additionally, you have shown the traits that the Harris County Fire Marshal's Office looks for in existing and future employees.

This training manual has been prepared for the purpose of providing all HCFMO Hazardous Materials Technicians involved in the Field Training Program (FTP) with the basic information required to effectively execute their respective roles within the organization. The manual contains on-boarding checklists, training modules, and other critical information, which will document the completion of FTP requirements in accordance with National Fire Protection Association (NFPA) 470: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Qualifications. It is incumbent upon all field training participants to become familiar with the contents and procedures set forth in this manual. It is the probationary Hazardous Material Technician's responsibility to retain this manual and to maintain it in the best condition possible.

The FTP will build upon an existing foundation by providing the probationary Hazardous Materials Technician with structured, organized training skills and knowledge in an effort to successfully complete the responsibilities required of all HCFMO Emergency Operations employees.

FTP personnel will make every effort to learn through competent one-on-one instruction. The probationary Hazardous Materials Technician's success will greatly depend on their ability to quickly retain and demonstrate information as well as to exercise self-initiative in assuming responsibility while maintaining control of situations.

Purpose

The HCFMO Emergency Operations/Hazardous Materials Response Field Training Manual has been developed to ensure that all probationary Hazardous Materials Technicians have the proper training to fulfill the assigned tasks while being mentored by a Field Training Officer/supervisor for the shift to which they are assigned and allow a seamless integration into the HCFMO.

Conclusion

After successful completion of the Field Training Program (FTP), the Hazardous Materials Technician will be considered a fully functional member of their dedicated shift and/or advised as to areas of development opportunity in order to ensure compliance with HCFMO tasks, policies, and procedures. It is understood that given the uniqueness and complexity of the position, the Hazardous Materials Technician will continue learning the application of their role beyond the Field Training Program. Hazardous materials response is a team effort, and less experienced Hazardous Materials Technician(s) will be continually supported and developed by their more experienced team members. A copy of the fully completed and authorized Emergency Operations/Hazardous Materials Response task book and particularly the Full Release form at the conclusion of the FTP will be placed in the permanent employee file.

EMERGENCY OPERATIONS

Mission

As provided by Chapter 352 of the Texas Local Government Code, by other statutes, and at the direction of the Harris County Commissioners Court—the publicly elected Harris County executive leadership, the HCFMO will safeguard the lives and property of citizens in unincorporated areas of Harris County through effective fire prevention, fire investigation, and emergency response.

HazMat Organizational Chart

Fire Marshal Laurie L. Christensen CFPS, FM, FEMT

Fire Marshal Christensen is responsible for the overall operation of the Harris County Fire Marshal's Office. She began her career in emergency services in 1991.

Assistant Chief R. W. "Bob" Royall, Jr.

Chief Royall is responsible for the overall operation of HCFMO Emergency Operations, reporting directly to the Fire Marshal. Chief Royall began his career in the fire service in 1973 with the City of Houston Fire Department, retiring as a Senior Captain after 31 years, over half of which as a Coordinator of the Hazardous Materials Response Team. He began his tenure with HCFMO in 2005 as Assistant Chief. Chief Royall also serves as HCFMO's Chief of Staff and Chief Financial Officer as well as in leadership roles on numerous committees.

Captain Richard Lawhorn

Captain Lawhorn is responsible for the day-to-day operations of the Hazardous Materials Response Team (HMRT), reporting directly to Chief Royall. Captain Lawhorn began his career in the fire service in 1987 with the City of Pasadena Fire Department, retiring after 28 years, the final eight (8) of which as Assistant Fire Chief. He began his tenure with HCFMO in 2004, serving as an HMRT Officer/Shift Commander. Captain Lawhorn also serves as a Vice Chairman of the Channel Industries Mutual Aid (CIMA), a regional response consortium.

Lieutenant Eugene Franco

Lieutenant Franco is responsible for the direct supervision of Harris County Hazardous Materials Response Team B-Shift, and reports to the HazMat Captain. Lt. Franco began his career in the fire service in 1977 and joined the Harris County Fire Marshal's Office in June 2002.

Lieutenant Rodney B. Janczak

Lieutenant Janczak is responsible for overseeing the day-to-day operations for his assigned shift. Lieutenant Janczak began his career in the fire service in 1997 and joined HCFMO in 2001.

Lieutenant James Lanphear

Lieutenant Lanphear is responsible for the daily operations of the Hazardous Materials Response Team (HMRT) C-Shift, reporting directly to Captain Lawhorn. Lieutenant Lanphear has been in the fire service since 1983 and began his career with the Harris County Fire Marshal's Office in 1998 as a Fire / Arson Investigator.

Lieutenant Richard Meehan

Lieutenant Meehan is responsible for the overall management of HCHMRT B-Shift and reports directly to Captain Lawhorn. Lieutenant Meehan began his career in the fire service in 1999 and joined the Harris County Fire Marshal's Office in October of 2005.

Sergeant Cody Baker

Sergeant Baker is responsible for the day-to-day operations of the B Shift on the Hazardous Materials Response Team (HMRT), reporting directly to Lt. Meehan. Sergeant Baker began his career in the fire service in 2001 and joined HCFMO in 2006.

Sergeant Ray Stearns

Sergeant Stearns began his career in the fire service in 1992 with the City of Liberty Fire Department as a firefighter/paramedic and finishing out his tenure as a captain. He began his tenure with HCFMO in 2004 as a hazardous materials technician.

Philosophy

The department's operating philosophy is based on four embodiments of our core values. Everything we do, every day we do it, relies on every staff member's firm belief and solemn pledge that:

We will serve our Customers . . .

HCFMO exists to serve our citizens, local first responders, other agencies, and each other. We will put our customers' needs first, and we will treat each customer with courtesy and respect.

We will preserve our Reputation . . .

HCFMO is recognized for integrity, justice, professionalism, accountability, and innovation. We will maintain this reputation through adherence to our Core Values, through continuous quality improvement (CQI), and our ongoing commitment to excellence.

We will take care of our People . . .

HCFMO employees and non-paid volunteers are our greatest asset. We will provide a work environment that promotes safety, open communication, and recognizes the contributions of all team members. We will provide the necessary facilities, tools, and equipment to accomplish our assignments safely, completely, and in accordance with recognized standards of performance.

We will secure our Future . . .

HCFMO will provide value-added services for the citizens of Harris County and elsewhere as authorized by Commissioners Court. We will accomplish our mission with integrity, commitment, and excellence; will protect the taxpayer's investment by properly using and caring for all equipment assigned for our use; will actively seek the best value when purchasing equipment or contract services and will reduce waste whenever possible.

Operational Considerations

Fire Marshal Code

The Harris County Fire Marshal's Office advocates commitment to a standard of professional behavior that exemplifies the highest ideals and principles of ethical conduct. The governing concepts embodied in this philosophy are characterized herein below, for the benefit and guidance of those so engaged, and for the enlightenment of the public so served.

- Place the public's welfare above all other interests and recognize that the chief function of government is to serve the best interest of all the people.
- Demonstrate integrity, honesty, and fairness in all transactions and constantly strive for excellence in all matters of ethical conduct.
- Recognize the continuing need for developing improved safety.
- Maintain professional competence in all areas of employment responsibility and encourage the same for all associates at all levels.
- Accept no personal favors for public services rendered and conscientiously avoid all circumstances that could compromise professional integrity.

ROLE OF THE HAZMAT TECHNICIAN

A Hazardous Materials (HazMat) Technician is a certified task-level position that performs technician-level duties in accordance with national standards and the Texas Commission on Fire Protection. The position of HazMat Technician may include the role of a peace officer if the individual holds a valid TCOLE license. A HazMat Technician reports to a HazMat Sergeant and may report to other senior staff members depending on assignment and may work from either office or field location, depending on work assignment. A HazMat Technician is required to maintain the required certifications as described in the requirements for the position.

It is the intent of the Fire Marshal's Office that all emergency operations and hazardous materials responses will be conducted in a safe, impartial, thorough, and profession manner, in accordance with applicable nationally recognized guidelines.

As a Hazardous Materials Technician, you should strive to provide the best possible customer service while following these guidelines.

- All HCFMO personnel who response to hazardous materials emergencies with HCFMO shall be guided by the competencies set forth in NFPA 470, "Standards for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents" along with other applicable NFPA codes and standards and the Texas Local Government Code Sections 352 and 233.
- All HCFMO personnel are expected to maintain high standards of excellence and conduct themselves in a professional manner when representing the HCFMO in any county-related activity. Personnel shall not act or behave, privately or in an official capacity, in such a manner as to bring discredit upon themselves or the HCFMO. Personnel shall obey all federal, state and local laws.
- All emergency operations/hazardous materials response equipment usage should be reported to the relieving Hazardous Materials Technicians with, as applicable, reporting records entered into the HCFMO records management system(s) in an expeditious manner for managerial administrative and technical review.
- All administrative compliance documents specific to the Fire Marshal's Office, such as Fire Marshal's Orders, Fire Code Violation Letters, and/or issued citations, shall be issued/administered by other divisions in support of Emergency Operations and in compliance with current adopted codes, policies, and procedures and documented in the HCFMO records management system(s).

FTO PROGRAM DEVELOPMENT

The Harris County Fire Marshal's Office Field Training Program (FTP) was originally instituted in the fall of 2012. The FTP was developed in concert with the HCFMO Professional Competence Development Program for Emergency Operations to provide a standard base of excellence for all future HCFMO Hazardous Materials Technicians. The program will continue to develop with the ever-changing field of emergency operations/hazardous materials.

None of this would have been possible without the help and support of all HCFMO employees. Their assistance with and acceptance of the program is greatly appreciated and will continue to drive the progressive nature of HCFMO to be the standard for best practices throughout the industry.

PROGRAM STRUCTURE AND FORMAT

The Field Training Program (FTP) consists of an initial series of classroom-style instruction, which will cover a variety of subjects, to include organizational orientation, introduction to employee handbook, introduction to policies and procedures, and other information pertinent to the HCFMO Hazardous Materials Technician. At the end of the initial training portion, the probationary Hazardous Materials Technician will progress through their Field Training Manual (FTM) along with an assigned Field Training Officer (FTO)/supervisor.

Inside the FTM will be several modules, and each module will have objectives and requirements for demonstration by the probationary Hazardous Materials Technician. Each time that the probationary Hazardous Materials Technician completes demonstration of a task outlined in the module, the probationary Hazardous Materials Technician will:

- Have the task signed off by the assigned FTO/supervisor that is responsible for the probationary Hazardous Materials Technician mentoring.

All modules of the training program shall be completed and signed off on prior to the probationary Hazardous Materials Technician being released from the training program and eligible for:

- Release from probationary status
- Promotional opportunities

When the FTM is complete, the assigned FTO/supervisor shall complete the applicable section(s) and forward the Full Release form located at the conclusion of the FTM.

For assignments that may not be readily available, class(es) may be provided to assist in completion of the required training. Those classes could take the place of some of the required documentation, as applicable. Written performance during the class would be evaluated by the instructor for satisfactory completion of that portion of the FTP.

Each probationary Hazardous Materials Technician involved in the FTP is responsible for keeping up with his or her FTM. When a module or portion of a module is complete, it is the probationary Hazardous Materials Technician's responsibility to have it signed by the assigned FTO/supervisor.

- Losing or misplacing your FTM will, for documentation purposes, result in having to begin the FTP again.

Prior to completion of any training module the probationary Hazardous Materials Technician will be required to demonstrate satisfactory proficiency in either oral or written form. Prior to completion of the FTP, the probationary Hazardous Materials Technician may be required to demonstrate satisfactory proficiency in total job assignment, in oral or written form. This will include the requirement for completion of the HCFMO Hazardous Materials Task Book.

At completion of the FTP, the probationary Hazardous Materials Technician will be required to complete a Field Training Program Evaluation Form. This form will be reviewed by the Emergency Operations/Hazardous Materials Response leadership, and the program will be adjusted as needed.

FTM Training Modules

The following is to be completed and signed upon the completion of the initial, classroom-style instruction and the issuing of the FTM.

Orientation Understandings

1. The assigned FTO/supervisor are the training supervisor or designee responsible for assuring proper training and compliance with the FTM.
    a. The probationary Hazardous Materials Technician will follow their directions/orders at all times during an incident.
    b. In the event the probationary Hazardous Materials Technician has any questions regarding the prescribe actions, they shall discuss them with the FTO/supervisor when the incident has been brought to a conclusion.
2. If at any time you and the FTO have a disagreement and cannot resolve the issue, both shall report to the Hazardous Materials Captain or Chief Officer.
3. In the event a probationary Hazardous Materials Technician fails to pass a scene performance evaluation, the probationary Hazardous Materials Technician will be, at the discretion of the FTO/supervisor, required to complete remedial and observatory training before continuing the required training module.
4. Maintenance of the FTM is your responsibility.
5. It is the responsibility of the probationary Hazardous Materials Technician to know their satisfactory progression through the training.
    a. The FTO will keep monthly documentation of progress to include strengths and areas of improvement.

Field Training Program Start Date: _____

I have explained the above items to probationary HazMat Technician _____
(Print)

_____	_____	_____
Supervisor (Print)	Date	Supervisor Signature

I have read and understood the requirements outlined in the Field Training Program.

_____	_____
Probationary HazMat Technician (Sign)	Date

FINALIZED CHECKLIST

The following modules are to be signed-off by the attending FTO or assigned after successful completion of the module, in its entirety.

MODULE	COMPLETED		
	Initials	FTO Signature	Date
1. General Orientation	_____	_____	_____
2. Required Training	_____	_____	_____
3. Hazmat Program Orientation	_____	_____	_____
4. Scene Performance	_____	_____	_____
5. Report Writing	N/A	N/A	N/A
6. Follow Up/Referrals	_____	_____	_____
7. HCFMO HazMat Task Book	_____	_____	_____
8. Body Worn Cameras	N/A	N/A	N/A

ADDITIONAL COMMENTS:

_____

_____

_____

_____

RECOMMENDATIONS: _____

_____

_____

_____

MODULE 1 – GENERAL ORIENTATION

Location: Harris County Fire Marshal's Office
Personnel Required: FTO/Supervisor & Probationary Hazardous Materials Technician
Supporting Documents: Emergency Operations Orientation/HazMat Technician Equipment Issue

During this Module, the probationary Hazardous Materials Technician shall learn the basic principles essential to beginning a career with the Harris County Fire Marshal's Office.

- Introduction to the HCFMO Organization
    - HCFMO:
        - Mission
        - Core Values
        - Operational Philosophy
    - Overview of the HCFMO Office
        - Investigations
        - Prevention
        - Emergency Operations
        - Operational Support / Training
        - Regulatory Enforcement Services
        - Youth Firesetters Intervention Program
        - Community Outreach
    - Introduction to Policies & Procedures
        - HCFMO
        - Harris County
        - WebHC
- Logistics
    - Issuing of Identifications
    - Issuing of Uniforms/Equipment
    - HazMat Quartermaster
        - Gear
        - Station lockers
- Critical Site Locations
    - Specific County Locations
    - Fuel Sites
    - Vehicle Maintenance Locations
    - Emergency Locations
- Performance Expectations
- Uniform and Appearance Standards

- Technology
    - Computer
    - HCFMO WebHC
    - Policies
        - Integrity Certification Assistant
    - Payroll
        - Paychecks
        - Emergency Contact(s)
        - Deductions
    - Apparatus
        - Equipment
        - Supplies
    - Target Solutions
        - Confirm Certifications
        - Required Continuing Education (CE)
            - Texas Commission on Fire Protection (TCFP)
            - Texas Department of State Health Services (TDSHS)
            - Texas Commission on Law Enforcement (TCOLE)
        - National Incident Management System (NIMS) 100, 200, 700, 800
    - Criminal Justice Information System (CJIS)/OMNIXX (TCIC/NCIC)
        - Required Law Enforcement Agency Coursework
    - Emergency Reporting
        - Incident Response Reporting
- Shift Work
    - Calendar
        - Shifts, 24 hours: A B A B C D C D
    - Trading
    - Timesheet
        - Time Off
    - Compensatory “Comp” Time
        - Limits/Management
- Driving
    - Texas Class B Exempt Driver’s License
    - Driver training log (refer to the Task Book)

- If Peace Officer:
    - Weapons Proficiency
        - In accordance with the HCFMO firearms policy, each law enforcement officer shall qualify with the weapon that they carry on duty as well as any weapons that they carry off duty. The qualifications will take place with a HCFMO firearms training officer and in accordance with all guidelines outline in the firearms policy.
            - **This will be required prior to the probationary Hazardous Materials Technician being allowed to carry a firearm on or off duty**.
    - TCOLE Certification Level
        - Peace Officers must have completed or complete a Field Training Program.
            - The TCOLE Compliance Officer/Designee must be notified once this Field Training Program is completed to then notify TCOLE.

Supervisor:

Initial above next to sections as completed.

Sign, print, and date once all are complete: _____ _____

MODULE 2 – REQUIRED TRAINING

Location: On-Scene, Classroom, and Online Resources
Personnel Required: Supervisor or FTO / Probationary Hazardous Materials Technician
Supporting Documents: None

Harris County Fire Marshal's Office is dedicated to serve and protect the residence of Harris County in the most effective means possible. Continued training is required by HCFMO as well as by all state licensing organizations which certifies the Probationary Hazardous Materials Technician to do the job requirements. The following classes must be completed, and certificates provided, during the Field Training Program.

Additionally, this Module cannot be completed until the HCFMO 472 Task Book is completed.

- Operational Classes
  - Harris County or HCFMO Classes
    - 3807 TCIC / NCIC Less Than Full Access (Lt. Scott Schoonover)
    - JIMS Training (HCJIMS)
    - Computer Aided Dispatching (CAD)
    - CJIS Security Awareness

- Incident Management Training
  - All classes provided online at: http://www.fema.gov/emergecny/nims/NIMSTrainingCourses.shtm#item1

    - IS-00100: Introduction to the Incident Command System
    - IS-00200: ICS for Single Resources and Initial Action Incident
    - IS-00700: National Incident Management System
    - IS-00800: National Response Framework, An Introduction

- Law Enforcement Class
  - Class Provided by TEEX (Coordinate with Supervisor/FTO for registration)
    - TEEX Basic Criminal Investigations (*Upon availability*)

- HCFMO 472 Task Book
  - Demonstrated proficiency utilizing the HCFMO 470 Task Book, supplemented by JPRs.

Required Training Checklist

Training	Completion Date	Certificate Received	FTO Signature	Date
3807 TCIC / NCIC				
JIMS Training				
CAD Training				
CJIS Security Awareness				
IS-00100				
IS-00200				
IS-00700				
IS-00800				
Basic Criminal Investigations				
FMO NFPA 470 Task Book				

MODULE 3 – HAZMAT PROGRAM ORIENTATION

Location: Training Room
Personnel Required: Supervisor / Probationary Hazardous Materials Technician
Supporting Documents: PSTrax, Responder360, Emergency Reporting, HCFMO Notification Cards

This module of the FTP will introduce the Probationary Hazardous Materials Technician to the HCFMO data collection programs such as PSTrax for equipment inventory tracking and apparatus maintenance and mileage documentation, Responder360 for incident mapping and Pre-incident Planning data collection, and Emergency Reporting for HazMat Incident Reports and reporting preplan documentation to the Inspections Division.

This class will serve as the introduction to the programs to include accessing, using, troubleshooting, and daily application.

Performance Required:

Access PSTrax, Responde360, Emergency Reporting, and HCFMO Notification Cards

- How to access PSTrax
    - Enter the daily equipment inventory
    - Enter equipment after maintenance and functionality checks
    - Enter daily medical screening data
    - Enter apparatus daily and monthly maintenance and mileage documentation
- How to access Responder360
    - Navigate the response mapping software
    - Navigate the incident information feature for call note information
    - Enter HazMat Preplan information
- How to access Emergency Reporting
    - Enter HazMat incident response information into the Incident Report feature
    - How to conduct a historic search for an incident report(s) in the system
    - How to refer a completed HazMat Pre-incident Plan to the Inspections Division for entry into Emergency Reporting.
- HCFMO Notification Cards
    - HCOHSEM Trigger Card
    - HCFMO HazMat Response Trigger Card

Supervisor:
Initial above next to sections as completed.
Sign, print, and date once all are complete: _____
_____

Scene Performance

Case Number	Date	Pass/Fail	FTO Signature
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. (R)_____	_____	_____	_____
7. (R)_____	_____	_____	_____

(R) Remedial Case Lead Training

Evidence Collection

Case Number	Date	Pass/Fail	FTO Signature
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____

Notes:

_____
_____
_____
_____

MODULE 4 – SCENE PERFORMANCE

Location: On-Scene
Personnel Required: FTO supervisor or designee / Probationary HazMat Technician
Supporting Documents: NFPA 470

This module of the FTP will allow the Probationary HazMat Technician to properly function at a Hazardous Materials incident scene. The Probationary HazMat Technician shall perform the duties assigned by the FTO supervisor or designee. The on-scene performance shall be observed and properly documented by the FTO supervisor or designee and shall be in compliance with the policies of the Harris County FMO and the competencies set forth in NFPA 470.

The Probationary HazMat Technician shall follow orders given by the FTO supervisor or designee and the Officer in Charge in accordance with the Harris County Fire Marshal's Office Policy 5.001 HazMat Response/Incident Command and operate within the established Incident Command System (ICS) as prescribed by the National Incident Management System (NIMS).

Performance Required:

- The ability to respond to potential incidents that may involve fires, spills, release of material, transportation emergencies, reactions resulting in chemical (toxic/corrosive), explosive, biological, radiological, explosive situations.
- I.D. roles, responsibilities, and assignments of HMRT personnel.
    - Safety
    - Operations
- Understand the importance of notifying the Harris County Office of Homeland Security and Emergency Management on-call line of any significant HazMat incidents.
    - Large scale transportation or fixed facility incidents
    - Community impact
        - Significant loss of life
        - Shelter-in-place, evacuations
        - Serious injury or fatality of response personnel
        - Incidents causing major roadway, highway, toll road or ship channel closures
        - Potential/confirmed mass casualty incident
- Upon arrival on-scene, recognize the requirement to report to the Incident Commander and receive a situational briefing.

- Operate as a Branch, Group, Division, or single resource within the Operations Section
- Participate in a hazard/risk assessment
    - Collect hazard information
    - Identify potential risk before taking action
    - Make recommendations to the Incident Commander concerning shelter-in-place, evacuations, or a combination of both.
    - Determine and make recommendations to the Incident Commander on Personal Protective Equipment (PPE) for on-scene responders
    - Determine proper level of PPE or Chemical Protective Clothing for HazMat personnel
- Develop and recommend to the Incident Commander a plan of action to mitigate the emergency
    - Recognize that the safety of all HazMat personnel is a top priority
    - Determine the need for immediate rescue or evacuation of persons on scene if applicable
    - Determine measures to confine and control the spread of contamination
    - Determine decontamination needs and processes
- Identify a "Responsible Party"
    - Assist the Incident Commander with environmental clean-up and disposal considerations
    - Understand that Harris County HazMat is never authorized to contract with an environmental clean-up company.

Supervisor:

Initial above next to sections as completed.

Sign, print, and date once all are complete: _____

_____

REPORT WRITING

	Case Number	Date	Pass/Fail	FTO Signature
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	(R)_____	_____	_____	_____
7.	(R)_____	_____	_____	_____

(R) Remedial Case Lead Training

Notes:

_____
_____
_____
_____
_____
_____

MODULE 5 – REPORT WRITING

Location: On-Scene, Office, Classroom
Personnel Required: Supervisor FTO / Probationary Hazardous Materials Technician
Supporting Documents: Emergency Reporting

An essential part of Hazardous Materials response is the proper documentation of information collected and/or observed during the incident. The Probationary Hazardous Materials Technician will be required to enter in all applicable data into the Emergency Reporting System in accordance with the National Fire Incident Reporting requirement for HCFMO.

- **Incident** (date & time of dispatch)
- **Incident Type**
- **Hazardous Materials Involved**
- **Casualties (if applicable)**
- **Location Type (Property Use)**
- **Apparatus, Personnel, Times**
- **Actions Taken**
- **Responsible Party, Driver Information**
- **Incident narrative**
- **Uploads**
    - Photos
    - Vehicle VIN number if applicable
    - Insurance information if applicable
    - SDS' or other documents
- **How to close out HazMat Incident Report in the system**

The probationary Hazardous Materials Technician will be required to complete five (5) original HazMat Incident Reports. The review of the FTO supervisor approving the report and narrative in Emergency Reporting is needed to complete each part of the module.

Sample HazMat Incident Report

Harris County Fire Marshal
Station: **1**
Shifts Or Platoon: **B Shift**

Location: **EAST FWY** **CHANNELVIEW TX 77530** **0 - 15800 EAST FRWY EB** Lat/Long: **N 29° 46' 40.04"** **W 95° 7' 27.92"** Zone: **Channelview ESD 50 - KA510** Location Type: **2 - Intersection** Map Page: **498F** Cross Street, Directions or National Grid: **0 - 15800 EAST FRWY EB**	Incident Type: **413 - Oil or other combustible liquid spill** FDID: **KA664** Incident #: **2022-100120** Exposure ID: **63339498** Exposure #: **0** Incident Date: **01/01/2022**

Report Completed by:	Baker , Cody	**ID:** 95H21	**Date:** 01/01/2022
Report Reviewed by:	**Not Reviewed**		
Report Printed by:	Royall, Bob	**ID:** 956	**Date:** 1/19/2022 **Time:** 11:20

Structure Type:	Property Use: **961 - Highway or divided highway**				
Automatic Extinguishment System Present: ☐	Detectors Present: ☐	Cause of Ignition:			
Aid Given or Received: **None**	Primary action taken: **43 - Hazardous materials spill control and confinement**				
Losses	**Pre-Incident Values**				
Property:	Property:	Civilian Injuries:	**0**	Fire Service Injuries:	**0**
Contents:	Contents:	Civilian Fatalities:	**0**	Fire Service Fatalities:	**0**
Total:	Total:	Total Casualties:	**0**	Total Fire Service Casualties:	**0**
Total # of apparatus on call:	**2**	Total # of personnel on call:	**3**		

Special Studies	
COVID 19 was a factor in this incident.	No, COVID 19 was not a factor.

Narrative from dispatch:

NARRATIVE (2)

Narrative Title: 100120

Narrative Author: Baker, Cody

Narrative Date: 01/01/2022 21:27:20

Narrative Apparatus ID: HM-1

Narrative:

The Harris County Hazardous Materials Response Team (HCHMRT) was requested to assist the Channelview Fire Department with a oil spill resulting from a motor vehicle collision. Upon arrival, we met with the Fire Department Incident Commander for a situational briefing and then conducted an on scene hazard and risk assessment. During the assessment it was noticed that a tractor trailer and a four door sedan had collided while both making a left turn. The tractor trailer sustained heavy damage to the front of the tractor, which resulted in damage to the engine, radiator and the oil pan in the engine compartment. The majority of the oil capacity in the tractor spilled on the roadway and eventually flowed into the storm drain. Prior to HCHMRTs arrival Channelview Fire Department deployed clay absorbent to contain the remaining oil that had spilled. HCHMRT made contact with the driver of the tractor, which stated his company had already contacted Oil Mop to remediate the spill on the roadway. HCHMRT gathered photo and written information with the driver of the tractor trailer. Once Oil Mop arrived on scene they immediately started cleaning the roadway and removing all hazards and debris. All HCHMRT units returned to service without issue.

APPARATUS

Unit	HM-1	**Unit**	UT-1
Type:	HazMat unit	**Type:**	HazMat unit
Use:	Other	**Use:**	Other
Response Mode:	No Lights or Sirens	**Response Mode:**	No Lights or Sirens
# of People	2	**# of People**	1
Alarm	01 /01/2022 12:47:51	**Alarm**	01 /01/2022 12:47:51
Dispatched	01 /01/2022 12:47:51	**Dispatched**	01 /01/2022 12:47:51
Enroute	01 /01/2022 12:47:51	**Enroute**	01 /01/2022 12:47:51
Arrived	01 /01/2022 13:18:54	**Arrived**	01 /01/2022 13:20:15
Cancelled	-- / -- / -- -- : -- : --	**Cancelled**	-- / -- / -- -- : -- : --
Cleared Scene	01 /01/2022 13:57:15	**Cleared Scene**	01 /01/2022 13:59:08
In Quarters	-- / -- / -- -- : -- : --	**In Quarters**	-- / -- / -- -- : -- : --
In Service	-- / -- / -- -- : -- : --	**In Service**	-- / -- / -- -- : -- : --

Number Of People not on apparatus: 0

VEHICLES

Vehicle 1XKYDP9X9LJ296347

Make	Kenworth
Type	
Model	T680
Color	Blue
Vin Number	1XKYDP9X9LJ296347
Year	2019
License Plate Number	TX 118J42

Owner

Name	Coastal Transport Co., Inc.
Phone Number	
Address	1603 Ackerman RD, San Antonio, TX 78219

Driver

Name	Rondale Dehon Taylor
Phone Number	
Address	14706 Kings Head DR, Houston, TX 77044
License Number	14910295 TX
Driver Is Owner	No
Driver Is Resident	Yes

Insurance

Company Name	Texas Hub International Transportation Insurance
Company Policy Number	CTC8150000-13
Company Coverage Level	
Agent Name	
Agent Phone Number	800-369-9010

Involvement

Law Enforcement Officer	
Police Report Or File Number	
Number Of Occupants	1
Number Of Injured Occupants	0
Number Of Fatalities	0
Disposable Equipment Used	
Narrative Text	

CUSTOM FIELDS FORM	
FMO Case Number	
Narrative Entered	
Incident Status	HazMat Incident (HMRT Only)
Closed Code	
Closed Date	
Referred To:	
Juvenile Involved	
Fireworks Injury	
Number of Juveniles Referred	
Juvenile (JFS) Referral	
K-9 Deployment and Use?	No
Property Use (HazMat Required)	
Incident Type (HazMat Required)	
Amount of AR-AFFF Foam Used	
Injuries not in Casualty Tab	
Deaths not in Casualty Tab	
AES Save?	

INCIDENT IMAGES













PERSONNEL ON CALL

Name	Personnel Rank	Role(s)	Apparatus
Baker, Cody	Sergeant		HM-1
Hemphill, Ray	HMRT Tech		HM-1
McCain, Christopher	HMRT Tech		UT-1

Investigative Follow-Up

	Case Number	Date	Pass/Fail	FTO Signature
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	(R)_____	_____	_____	_____
5.	(R)_____	_____	_____	_____

(R) Remedial Case Lead Training

Interview

	Case Number	Date	Pass/Fail	FTO Signature
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	(R)_____	_____	_____	_____
4.	(R)_____	_____	_____	_____

(R) Remedial Case Lead Training

Notes:_____

_____

_____

MODULE 6 –FOLLOW-UPS/REFERRALS

Location: On-Scene
Personnel Required: Supervisor or FTO / Probationary Hazardous Materials Technician
Supporting Documents: None

In this module the Probationary Hazardous Materials Technician will be required to conduct follow ups as needed to obtain additional information and/or referral to other HCFMO divisions or entities. The Probationary HazMat Technician will demonstrate how and when referrals to other HCFMO divisions or entities are to be executed.

Follow-ups and possible referrals will result from issues found during the original incident response. Referrals to other divisions or entities may be the result of:

- Potential fire/life safety concerns (Referral to the Inspection Division should be immediate)
- Spills or releases that impact the environment
    - Spills and air releases in Harris County should be referred to Harris County Pollution Control Services.
    - Spills and air releases outside of Harris County should be referred to the Texas Commission on Environmental Quality, this includes spills that impact the “Waters of Texas” (inland lakes and streams).
    - Spills that impact coastal waters should be referred to the Texas General Land Office.
    - Spills impacting a navigable waterway should be referred to the U.S. Coast Guard or U.S. Environmental Protection Agency.
- Potential environmental crimes should be referred to Harris County Constable Precinct #1, Environmental Crimes Division.
- Suspected illegal or criminal activity should be referred immediately to the Investigation Division for emergent issues or to the proper Law Enforcement Agency for investigative purposes.
- Ensure that HCFMO mission statement, core capabilities, and operational capabilities are met in every interaction.

Task Book

Harris County

Hazardous Materials Technician

The Task Book is administered in accordance with National Fire Protection Association (NFPA) 472, 473, and 1072 as well as Occupational Health and Safety Administration (OSHA) 29 CFR 1910.120, ensuring that Harris County Hazardous Materials Technicians meet established professional qualifications.

TASK BOOK INSTRUCTIONS

The Field Training Officer or Instructor shall establish the following:

1. The criteria established in the Task Book is meant for all personnel assigned to the Hazardous Materials Response Team including Hazardous Materials Technicians, Sergeants, Lieutenants, and Captains in the Emergency Operations Division of the Harris County Fire Marshal's Office.

2. The intent of the Task Book is to supplement the Hazardous Materials Technician's understanding of the following topics:

    - Title CFR 29 1910.120(q)
    - NFPA 470
    - NFPA 1620
    - Hazmat Apparatus Familiarization
    - Response Mitigation
    - Monitoring and Detection Operation
    - WMD Response
    - Suspicious Substance Protocols

3. The Field Training Officer / supervisor or designee shall on-view and sign off on the demonstration of each requirement and/or competency included within the Task Book. Once completed, the Probationary Hazardous Materials Technician's direct supervisor shall sign-off, verifying completion. The Task Book will then be signed off by the Division Chief and documentation shall be completed in accordance with HCFMO Policy.

TASK BOOK - TABLE OF CONTENTS

SECT. 1 – CERTIFICATIONS & TRAINING REQUIREMENTS

Texas Commission on Fire Protection (TCFP)

Performance criteria	FTO Initials
TCFP Certified HazMat Technician	

Harris County Hazmat Recommended Courses

Performance criteria	FTO Initials
The following DHS federally funded classes are a recommended for the HC HazMat Technician. It is strongly recommended that the courses attended be in the order that follows	**N/A**
Complete Center for Domestic Preparedness (Anniston, AL) Hazardous Materials Technician (24 hours).	
Complete Advanced Chemical and Biological Integrated Response Course (Dugway, UT) Technician Level Training (40 hours).	
Complete Counter Terrorism Operations Support / National Nuclear Security Administration (Las Vegas, NV) Hazardous Materials Technician (32 hours) or pre-approved equivalent.	

Additional Classes

The following list includes classes that are not part of the initial task book recommendations. In addition to having the option of repeating the above-required courses, the following are additional classes that are also optional for attendance.
Energetic Materials Research and Testing Center – Socorro, NM
Prevention and Response to Suicide Bombings Incident (PRSBI) – 32 hours
National Center for Emergency Response in Surface Transportation – Pueblo, Co. • Tank Car Specialist (TCS), 40 hours • Highway Emergency Response Specialist (HERS), 40 hours • Leadership and Management Surface Transportation Incidents (LMSTI), 40 hours • HAZMAT/WMD Technician for Surface Transportation (HWMDTST), 80 hours

See Appendix A for Outside Training Course Information

SECT. 2 – APPARATUS FAMILIARIZATION

Texas Commission on Fire Protection

Texas Commission on Fire Protection Curriculum Manual Chapter 1

Performance criteria	FTO Initials	Date
TCFP Chapter 1, Section 101, Competency 5.1.1 – General Knowledge Demonstrate thorough knowledge of apparatus including: • Location of all equipment • Truck on-scene setup • Proper steps to operate generator • Proper steps to operate compressor/on board air supply system • Ability to troubleshoot equipment		
TCFP Chapter 1, Section 101, Competency 5.3.16 – Portable Extinguishers and Extinguishing Agents Possess working knowledge of extinguishers carried on all HazMat units.		
Possess working knowledge of neutralization agents including: • Soda Ash		

Decon Trailer

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 5, Competency 5.3.4 – Emergency Decontamination Issues Demonstrate competency - Operation of decon trailer		
Demonstrate thorough knowledge of setup and operation of decon trailer including: • Placement • Water source • Water heater start up procedures • Capabilities & Limitations		

Driver Training

Performance criteria	FTO Initials	Date
TCFP Chapter 1, Section 101, Competency 5.1.1 – General Knowledge Demonstrate knowledge of non-emergency basic vehicle operation(s) of all HazMat units.		
Demonstrate knowledge of non-emergency heavy vehicle operation(s) of all HazMat units.		
Demonstrate knowledge of emergency vehicle operation(s) of all HazMat units.		
Demonstrate knowledge of vehicle backing operation(s) of all HazMat units.		

Driver Training Driving Log

Date	Unit	Miles	FTO

SECT. 3 – RESEARCH

Research Tools

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 5, Competency 5.2.2 – Collecting Hazard and Response Information Demonstrate knowledge and use of programs for research. • ALOHA • CAMEO • MARPLOT • WISER		

HazMat Terms

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.2.2 – Describe Hazard and Response Terms Demonstrate knowledge of definitions of the following terms and their application to a hazardous materials incident: • Chemical Abstracts Service (CAS) • Immediately Dangerous to life or health (IDLH) • Recommended exposure limits (REL's) • Time-weighted average (TWA) • Short-term exposure limit (STEL) • Permissible exposure limit (PEL) • Molecular weight (MW) • Boiling point (BP) • Solubility (Sol) • Flash point (Fl.P) • Ionization potential (IP) • Specific gravity (Sp.Gr) • Relative gas density (RGasD) • Vapor pressure (VP)		

• Freezing point (FRZ) • Melting point (MLT) • Upper explosive limit (UEL) • Lower explosive limit (LEL)		

Notifications

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 5, Competency 5.2.2 – Collecting Hazard and Response Information Demonstrate ability to obtain from reference library and computer programs information necessary to assess the hazards of given materials. This assessment shall include: • Information concerning material identity and environmental reporting requirements • Physical and chemical properties • Flammability or combustibility • Toxicity information including all published exposure limits • Reactivity and radioactivity data • Fire, leak, and spill control considerations • Proper packaging and disposal procedures		
NFPA 470, Chapter 4, Competency 4.2.2 – Identifying Hazardous Materials/WMD Demonstrate knowledge of the 9 hazard classes and appropriate placards		
Demonstrate knowledge of resource books carried on both hazardous materials units		
Demonstrate ability to assess the risks to response personnel and the public		
NFPA 470, Chapter 4, Competency 4.4.1 – Isolate the Hazard Area Demonstrate ability to recommend appropriate isolation and protective action distances based on information provided		
NFPA 470, Chapter 4, Competency 4.4.2 – Initiating the Notification Process		

Demonstrate knowledge of notification procedures of partnering agencies, including: • Harris County Office of Homeland Security and Emergency Management • Harris County Public Health • Harris County Pollution Control • Harris County Sheriff's Office • Channel Industries Mutual Aid • Texas Department of Public Safety • Texas Department of Transportation • Texas Department of Environmental Quality • Texas Division of Emergency Management • Federal Bureau of Investigations • United States Coast Guard • 6th Civil Support Team		

SECT. 4 – PERSONAL PROTECTIVE EQUIPMENT

Research Tools

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 5, Competency 5.3.3 – Determining Suitability of Personal Protective Equipment Demonstrate ability to select the appropriate PPE ensemble for the hazard present, including: • Level A, Level B, Level C • Glove Selection • APRs, SCBA		
Demonstrate knowledge included in the Level A entry checklist		
Demonstrate understanding of suit and product compatibility (breakthrough time)		
Demonstrate ability to properly select required complete protective ensemble, including respiratory protection and dermal protection		

SECT. 5 – DECONTAMINATION

Types of Decontamination

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.4 – Performing Decontamination Operations Identified in the Incident Action Plan Demonstrate ability to acquire information concerning proper decontamination procedures from reference sources.		
Demonstrate ability to select an appropriate decontamination procedure, determine the equipment necessary to implement, and set-up, including: • Mass Decon • Ambulatory Decon • Non-ambulatory Decon • Technical Decon • Emergency Decon		
Demonstrate ability to setup the contamination reduction corridor necessary for the appropriate procedure.		
Demonstrate ability to perform decontamination on response personnel exiting the isolation area.		
Demonstrate ability to perform emergency decontamination procedure for both a contaminated responder and a non-ambulatory victim.		
Demonstrate ability to properly perform gross and secondary decontamination procedures for a patient.		
Demonstrate understanding of the procedures to be used for the decontamination of non-expendable equipment.		

Decontamination Solutions and Techniques

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.4 – Performing Decontamination Operations Identified in the Incident Action Plan Demonstrate knowledge of decon solution types and application, including: • Bleach • High pH soap powder • High pH liquid soap • Mild liquid soap • Dahlgren Decon Solution and electrostatic sprayer • RSDL, Chlorine Dioxide • Emulsifiers		
Demonstrate ability to utilize dry decon techniques		

Decontamination Equipment

Performance criteria	FTO Initials	Date

NFPA 470, Chapter 7, Competency 7.4.4 – Performing Decontamination Operations Identified in the Incident Action Plan
Demonstrate ability to setup all types of equipment, including
• Shower
• Pools
• Non-ambulatory decon
  ○ Conveyer system
  ○ SKED
  ○ Raven stretcher
• Shelter
• Trailer		

See Appendix C for specific decon solution information

SECT. 6 – FOAM

Types of Foam

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 6, Competency 6.6.3.1 – Selecting Product Control Techniques Demonstrate knowledge of different types of foams, including: • Compressed air foam • Class A foam • AFFF-ATC • Hydrocarbon dispersant		
Demonstrate ability to properly select foam specific for the hazard		
Demonstrate knowledge of ethanol blended fuels (example E10, E95, etc.)		

Application Techniques

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 6, Competency 6.6.3.1 – Selecting Product Control Techniques Demonstrate knowledge of foam delivery techniques, including: • Banking • Rolling • Raining Down		
Demonstrate knowledge of strategies and tactics used to combat tank farm fires		

Foam Delivery Equipment

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 6, Competency 6.6.3.1 – Selecting Product Control Techniques Demonstrate ability to setup and flow foam from the following devices: • 95 GPM Akron Eductor • 125 GPM Akron Eductor • Large flow foam nozzle • Foam wands/military applicator nozzles		
Demonstrate ability to properly setup and flow foam from the HCHMRT Foam Tendors/Trucks.		
Demonstrate knowledge of foam capabilities of Class A foam		
Demonstrate knowledge of foam capabilities of AFFF-ATC foam		

See Appendix D for foam calculations

SECT. 7 – DETECTION & MONITORING/ EQUIPMENT

Multi-Rae, 5 and 6 Gas


Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate ability to power up the unit and fresh air calibrate		
Demonstrate ability to access and navigate menu		
Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to select appropriate correction factor		

LCD, 3.2 and 3.3


Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities of meter		
Demonstrate ability to power up and clear meter		
Demonstrate ability to recognize warning devices for the following agents: Nerve Agent • Blister Agent • TIC • Blood Agent • Choking Agent		

HazmatID Elite

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of detection technology used in the instrument		
Demonstrate knowledge of detection capabilities and limitations of instrument		
Demonstrate ability to power up and setup instrument		
Demonstrate ability to access and navigate menu		
Demonstrate ability to prepare sample: • Liquid • Solid		
After product identification, demonstrate ability to access hazard specific information		

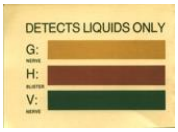
Ki Paper

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of papers detection capabilities		
Demonstrate ability to properly activate paper		
Demonstrate knowledge of papers color changing properties		

F Paper

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling		

Demonstrate knowledge of papers detection capabilities		
Demonstrate ability to properly activate paper		
Demonstrate knowledge of papers color changing properties		



M8 Paper

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of papers detection capabilities		
Demonstrate ability to properly test an unknown liquid		
Demonstrate knowledge of papers color changing properties		

M9 Paper

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of papers detection capabilities		
Demonstrate ability to properly test an unknown liquid		
Demonstrate knowledge of papers color changing properties		

M256 Kit

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of kits detection capabilities		

Demonstrate ability to properly perform steps of the kit safely		
Demonstrate ability to properly interpret test results		

Colormetric Tubes

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of kits detection capabilities and limitations		
Demonstrate knowledge of proper tube selection		
Demonstrate ability to properly assemble for metering		
Demonstrate ability to properly perform testing and interpret results		

908 Device

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to power up and clear meter		
Demonstrate ability to access and navigate menu		

AceID

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of application of detection device		
Demonstrate ability to set up and properly test sample		

Rigaku ResQ

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate Knowledge of detection capabilities and limitations of meter		
Demonstrate knowledge of alarm limits		
Demonstrate ability to power up and clear meters		
Demonstrate ability to access and navigate menu		

Radseeker

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate Knowledge of detection capabilities and limitations of meter		
Demonstrate knowledge of alarm limits		
Demonstrate ability to power up and clear meters		
Demonstrate ability to access and navigate menu		

Ludlum 2241

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in instrument		
Demonstrate knowledge of detection capabilities of instrument		
Demonstrate ability to power up		
Demonstrate knowledge of alarm limits		
Demonstrate ability to properly attach scintillator probe, and identify appropriate uses		
Demonstrate ability to properly attach pancake probe, and identify appropriate uses		
Demonstrate ability to access and navigate menu		

Interceptor

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in the instrument		
Demonstrate knowledge of detection capabilities of the instrument		
Demonstrate knowledge of alarm limits		
Demonstrate ability to power up and clear meter		
Demonstrate ability to access and navigate menu		

Jerome Mercury Detector

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in the instrument		
Demonstrate knowledge of detection capabilities of the instrument		
Demonstrate knowledge of alarm limits		
Demonstrate ability to power up and clear meter		
Demonstrate ability to access and navigate menu		

ChemPro 100i

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in the instrument		
Demonstrate knowledge of detection capabilities of the instrument		
Demonstrate knowledge of alarm limits		
Demonstrate ability to power up and clear meter		
Demonstrate ability to access and navigate menu		

Radeye SPRD-GN

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in the instrument		
Demonstrate knowledge of detection capabilities of the instrument		
Demonstrate knowledge of alarm limits		
Demonstrate ability to power up and clear meter		
Demonstrate ability to access and navigate menu		

Digital Thermometer

Performance criteria	OIC Initials	Date
Demonstrate knowledge of equipment capabilities and applications in a hazmat incident		
Demonstrate ability to power equipment		

PPB Rae

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to properly set up meter		
Demonstrate ability to power equipment		

Sensit HGx3 Gas Detector

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to properly set up meter		
Demonstrate ability to power equipment		

Identifinder

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to properly set up meter		
Demonstrate ability to power equipment		

ProRae Multi-Gas

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to properly set up meter		
Demonstrate ability to power equipment		

Thermal Imager Camera

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to properly set up meter		
Demonstrate ability to power equipment		

pH Paper

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of equipment capabilities and applications in a hazmat incident		
Demonstrate ability to power equipment		

In-Suit Communications

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 5, Competency 5.3.3 – Determining Suitability of Personal Protective Equipment Demonstrate ability to properly apply and operate mic		

Area Rae

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sensor technology used in meter		
Demonstrate knowledge of detection capabilities and limitations of meter		
Demonstrate ability to properly set up meter		
Demonstrate ability to power equipment		

Grab Sample Kit

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of sampling equipment		
Demonstrate knowledge of proper sample techniques		
Demonstrate knowledge of the Chain of Custody Process		
Demonstrate ability to properly package samples		

Plug and Patch Kit

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.2 – Controlling Leaks From Containers Demonstrate knowledge of plugging & patching equipment for leaks in atmospheric containers		
Demonstrate knowledge of proper plugging and patching techniques		

SECT. 8 – SUSPICIOUS SUBSTANCE RESPONSE

Response Protocols

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 6, Competency 6.5.3.1 – Identifying Unique Aspects of Criminal Hazardous Materials/WMD Incidents Demonstrate knowledge of Harris County HazMat's suspicious substance protocol		
Demonstrate knowledge of roles and responsibilities at a suspicious substance call		
Demonstrate knowledge of appropriate PPE selection		
Demonstrate ability to rule out the following safety considerations: • Corrosivity • Flammability • Radioactivity		
Demonstrate ability to properly complete chain of custody procedures		

Sampling Equipment

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 6, Competency 6.5.3.1 – Identifying Unique Aspects of Criminal Hazardous Materials/WMD Incidents Demonstrate ability to operate sampling devices including: • 20/20 • Ahura First Defender • AceID • MX908 • TruDefender FT • HazmatID Elite		

See Appendix E for JFRD Suspicious Powder Protocol

SECT. 9 – SPILL CONTROL

Plug and Patch Kit

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 6, Competency 6.6.3.1 – Selecting Product Control Techniques Demonstrate ability to develop a spill control plan and identify which spill activities are defensive and which would be considered offensive		
Demonstrate ability to properly select the necessary tools, equipment, and personnel to perform defensive and offensive spill control activities		
Demonstrate ability to perform offensive spill control procedures where direct contact with the product would be anticipated		
Demonstrate ability to perform the following spill control measures: • Dam, dike, and divert • Deploy oil boom and hydrophobic pads • Plug & Dike • Soda ash and Citric acid • pH Neutralization • Over Packs		

SECT. 10 – PRESSURIZED CONTAINER RESPONSE

Propane Emergencies

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.4 – Predicting Likely Behavior of Materials and Their Container Demonstrate knowledge of propane chemical properties		
Demonstrate ability to identify propane tank valves including: • Pressure relief device • Liquid evacuation, (new and old) • Vapor recovery • Fill port • Service Valve • Fuel Level Gauge • Outage Indicator		
Demonstrate ability to identify and understand uses of all propane valves, fittings, and adapters		
Demonstrate knowledge of meters required for detection		
Demonstrate ability to properly assess and mitigate propane emergencies including: • PRD malfunctions • Volume recognition • Open valves		

Natural Gas Emergencies

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.4 – Predicting Likely Behavior of Materials and Their Container Demonstrate knowledge of chemical properties		
Demonstrate knowledge of meters required for detection		
Demonstrate ability to properly assess and mitigate natural gas emergencies		

Grounding and Bonding

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.4.1 – Liquid Product Transfer Demonstrate knowledge of reasons why the skill is used		
Demonstrate knowledge of applications		
Demonstrate ability to properly setup		

Clamping and Squeezing

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.2.1 – Controlling Leaks from Containers Demonstrate knowledge to appropriately select device, specifically: • Diameter • Material		

NFPA 470, Chapter 7, Competency 7.4.3.2.1 – Controlling Leaks from Containers
Demonstrate ability to use device appropriately including:
• Saddle clamps
• Compression fittings
• Mustang
  ○ Hydraulic
  ○ Manually driven		

Flaring

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.2.1 – Controlling Leaks from Containers Demonstrate ability to set up equipment including: • Appropriate valve choice • Appropriate fitting • Appropriate hose length • Appropriate flare placement		
Demonstrate ability to flare both:		

• Liquid • Vapor		
Demonstrate knowledge of safety concerns including: • Radiant heat exposure • Environmental concerns • Extinguisher selection and positioning • Flare lighting • Disconnecting procedures		

Product Transfer

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.4.1 – Liquid Product Transfer Demonstrate ability to properly set up equipment including: • Tank access • Appropriate valve choice • Appropriate fitting		
Demonstrate knowledge of product transfer considerations including: • Liquid transfer • Compressed gas transfer • Corrosives		
Demonstrate ability to properly set up equipment including: • Stinger • Non collapsible hard suction hose • Pump (chemical and hydrocarbon) • Collapsible soft suction hose • Air compressor / Air supply system		
Demonstrate knowledge in pump selection including: • Chemical • Hydrocarbon		

Water Injection

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.4.1 – Liquid Product Transfer Demonstrate knowledge of when the skill is necessary		
Demonstrate ability to properly setup equipment		

Auto Refrigeration

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.2.1 – Controlling Leaks from Containers Demonstrate knowledge of when the skill is necessary		
Demonstrate ability to setup equipment		

Leak Control Equipment

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.4.3.2.1 – Controlling Leaks from Containers Demonstrate ability to apply equipment including: • Plug n dike • Plugging • Dome Clamps • Betts Valve • Chlorine A, B, C Kit • Midland Kit • Anhydrous Ammonia Kit • Wooden plugs • Sulfur Dioxide Kit • Hydrogen Chloride Kit		

SECT. 11 – WEAPONS OF MASS DESTRUCTION

WMD Equipment

Performance criteria	OIC Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.2 – Detection, Monitoring, and Sampling Demonstrate knowledge of WMD procedures		
Demonstrate knowledge of equipment abilities and uses, including: • Ki Paper • F Paper • Ph Paper • M8 Paper • M9 Paper • M256 Kit • Colormetric Tubes		

SECT. 12 – RADIATION

Terms

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.5.4 – Health Hazard Terms Demonstrate knowledge of definitions of the following terms and their application to a radiologic incident: • Alpha particles • Beta particles • Gamma rays • Neutron radiation • Ionizing Radiation • Radioactivity • Exposure • Contamination • REM • Sievert • Dose • Dose rate • Dose limit • As Low As Reasonably Achievable (ALARA) • Radiological Dispersal Device (RDD) • Half life • Stay time • Inverse Square Law		

Types of Radiation

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.5.4 – Health Hazard Terms Demonstrate knowledge of alpha radiation, including: • Distance traveled • Shielding requirements • Biological hazards		
Demonstrate knowledge of beta radiation, including: • Distance traveled • Shielding requirements • Biological hazards		

Demonstrate knowledge of gamma rays, including: • Distance traveled • Shielding requirements • Biological hazards		

Types of Radiation

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.5.4 – Health Hazard Terms Demonstrate knowledge of neutron radiation, including: • Distance traveled • Shielding requirements • Biological hazards		
Demonstrate knowledge of EPA guidelines for Emergency Procedures		
Demonstrate ability to use the Stay Time Chart		
Demonstrate ability to use the Inverse Square Law		
Demonstrate knowledge of protection measures, including: • Time • Distance • Shielding		

Packaging

Performance criteria	FTO Initials	Date
NFPA 470, Chapter 7, Competency 7.2.1.1.7 – Radioactive Materials Packaging Demonstrate knowledge of types of packaging for radiological materials, including: • Type A • Type B		
Demonstrate knowledge of labels and placards, including: • Radioactive I • Radioactive II • Radioactive III		

Demonstrate knowledge of how the Transport Index (TI) effects metering operations		

See Appendix F for radiation definition information

See Appendix G for Radiation Stay Time Chart

APPENDIX A – OUTSIDE TRAINING

Center for Domestic Preparedness (Anniston, AL)

https://cdp.dhs.gov

- Hazardous Materials Technician for CBRNE Incidents
- Incident Command for All Hazards with Hands on Training for CBRNE Incidents
- Hazard Assessment and Response Management

Energetic Materials Research and Testing Center (Socorro, NM)

http://www.emrtc.nmt.edu

- Incident Response to Terrorist Bombings
- Prevention and Response to Suicide Bombings Incident

Counter Terrorism Operation Support (Las Vegas, NV)

https://www.ctosnnsa.org

- WMD Rad/Nuc Course for HazMat Technicians

National Center for Emergency Response in Surface Transportation (Pueblo, CO)

http://www.hazmattraining.com

- Tank Car Specialist
- Highway Emergency Response Specialist
- Leadership and Management Surface Transportation Incidents
- Hazmat/WMD Technician for Surface Transportation

APPENDIX B – HAZMAT TERMS

Chemical Abstracts Service (CAS) – the number, in the format xxx-xx-x, is unique for each chemical and allows efficient searching on computerized data bases

Immediately Dangerous to life or health (IDLH) – ability of a worker to escape without loss of life or irreversible health effects

Recommended exposure limits (REL's) – NIOSH recommended

Time-weighted average (TWA) – concentration for up to a 10-hour workday during a 40-hour workweek

Short-term exposure limit (STEL) – unless otherwise noted, a 15-minute TWA exposure that should not be exceeded at any time during a workday

Permissible exposure limit (PEL) – OSHA permitted

Molecular weight (MW)

Boiling point (BP) – at 1 atmosphere, ˚F

Solubility (Sol) – in water at 68 ˚F, percent by weight

Flash point (Fl.P) – temperature at which the liquid phase gives off enough vapor to flash when exposed to an external ignition source

Ionization potential (IP) – given as a guideline for the selection of photoionization detector lamps used in some direct-reading instruments

Specific gravity (Sp.Gr) – at 68 ˚F referenced to water at 39.2 ˚F

Relative gas density (RGasD) – referenced to air = 1

Vapor pressure (VP) – at 68 ˚F, mm Hg

Freezing point (FRZ) – for liquids and gases in ˚F

Melting point (MLT) – for solids in ˚F

Upper explosive limit (UEL) – percent by volume in air

Lower explosive limit (LEL) – percent by volume in air

Minimum explosive content (MEC)

These definitions are referenced to the NIOSH Pocket Guide, Sept. 2005 edition

APPENDIX C – DECON SOLUTIONS

The following chart should be used as a guideline for selecting solutions for the type of hazard identified:

1. Inorganic acids, metal processing wastes – Solution A
2. Heavy metals: mercury, lead, and calcium – Solution B
3. Pesticides, chlorinated phenols, dioxins, and PCB's – Solution B
4. Cyanides, ammonia, and other nonacidic inorganic wastes – Solution B
5. Solvents and organic compounds such as trichloroethylene, chloroform, and toluene – Solution A or C
6. Oily, greasy, nonspecific wastes not suspected to be contaminated with pesticides – Solution C
7. Inorganic bases, alkali, and caustic wastes – Solution D
8. Radioactive materials – Solution E
9. Etiologic materials – Solution F

For known products within the 10 hazard classes:

Solution A: 5% sodium carbonate and 5% trisodium phosphate. Mix 4 pounds of commercial grade trisodium phosphate and 4 pounds of sodium carbonate with 10 gallons of water.

2 pounds per 5 gallons

Solution B: Solution of 10% calcium hypochlorite. Mix 8 pounds of calcium hypochlorite with 10 gallons water.

1 pound per 5 gallons

Solution C: A solution of water and 5% trisodium phosphate which can also be used as a general purpose rinse.

Solution D: Mix 1 pint of concentrated HCL into 10 gallons of water (always add acid to water, never add water to acid) to produce a dilute solution of hypochlorous acid – HCLO (a very weak acid).

1 cup per 5 gallons

Solution E: A concentrated solution of detergent and water. Mix into a paste and scrub with a brush. Rinse with water.

Solution F: A solution of 1 cup household bleach for every 10 cups of water OR 1 cup of hydrogen peroxide (3-4%) for every 10 cups of water.

1/2 cup per 5 gallons

CAUTION: The decontamination solutions listed above are recommended for 10 general groups of hazardous materials. Always seek expert assistance from manufacture, a poison control center, or medical specialists, etc., to determine the best solution to use.

APPENDIX D – FOAM CALCULATIONS

JFRD Nozzles and Eductors			
Eductors	Blanket Coverage (up to)	Gallons of Concentrate per min	Gallons of Concentrate for 65 min
95 GPM	950 sq. ft.	3	200
125 GPM	1,250 sq. ft.	4	260
240 GPM	2,250 sq. ft.	7	500
250 GPM	2,500 sq. ft.	8	550
1000 GPM	10,000 sq. ft.	30	2000
2000 GPM	20,000 sq. ft.	60	4000

Tank Diameter	Area (Square Foot)	GPM Needed	Nozzles/Eductors Needed	Gallons of Concrete for 65 min
DOT 406	440	125	1-125 GPM	260
50	1963	500	2-250 GPM	975
75	4418	1000	1-1000 GPM	1950
100	7850	2000	2000 GPM Cannon	3900
125	12266	3000	2000 GPM Cannon & 1-1000 GPM	5850

APPENDIX E – SUSPICIOUS SUBSTANCE PROTOCOL

SUSPICIOUS SUBSTANCE = CRIME SCENE				
Powder Calls are Law Enforcement Responses		JFRD Responds for Patient Care, Decontamination and Preliminary Product Identification	**NO DOWN RANGE TESTING** without a Law Enforcement representative	
1	**Threat Level**	Determine if High or Low		CHECK
2	**Isolate**	Restrict access of all responders and civilians		CHECK
3	**Decontamination**	All patients and responders must be decontaminated before being transported to emergency departments		CHECK
4	**Control Zones**	Set up Hot / Warm / Cold Restrict access to all responders and civilians		CHECK
6	**Gather Information**	All available sources		CHECK
7	**PPE**	Level B for all entrants including Law Enforcement		CHECK
8	**Rehabilitation**	Call for the Rehab Unit if there more than 5 patients or ambient temperature is elevated		CHECK
9	**Representative Sample**	Collect / Preserve / Document / Chain of Custody forms Push Packs to State Lab via JSO / RAD, LEL, pH, KI		CHECK
10	**Documentation**	All monitors readings and sample tests		CHECK
11	**Photography**	Prior to manipulating evidence if warranted		CHECK
12	**Field Sampling**	20/20 / MX908/Ace-ID/HazMatID Elite		CHECK
13	**Decontamination**	Entrants / Responders / Hot Zone		CHECK
17	**FBI** (Federal)	Joel Holmes (Primary)	713-819-1858	CHECK
		Justin Widup	281-936-8892	

APPENDIX F – RADIATION TERMS & DEFINITIONS

Alpha particles – range of up to 2 inches; shielded by paper, cloth, and dead layers of skin; not an external hazard but is an internal hazard

Beta particles – range of up to 30 feet; shielded by thick clothing, ¼ inch aluminum, ¼ inch plastic; external hazard to skin and eyes, internal hazard

Gamma rays – range of hundreds of feet; shielded by 1 inch of lead, 3 inches of steel, 6 inches of concrete, 1 foot of dirt; whole body hazard, external and internal hazard

Neutron radiation – range of hundreds of feet; shielded by 10 inches of plastic, 1 foot of concrete, 3 feet of dirt, 3 feet of water; whole body hazard, external and internal hazard

Ionizing Radiation – excess energy, from an unstable atom, capable of removing electrons from an atom

Radioactivity – the process of unstable (radioactive) atoms trying to become stable by emitting ionizing energy

Exposure – the amount of ionization in air

Contamination – radioactive material in an unwanted place

REM – most commonly used unit; pertains to the human body; takes into account the energy absorbed (dose) and the biological effect on the body due to the different types of radiation

- 1,000,000 microrem = 1,000 millirem = 1 rem

Sievert – international unit for measuring dose equivalence to the biological damage to man

- 1 sievert = 100 REM

Dose – total amount of radiation absorbed. Dose is measured in REM

Dose rate – rate at which the radiation is absorbed, per unit of time – generally indicates the hazard level from a radioactive source

Dose limit – amount of radiation exposure a person is allowed to receive, depending on the circumstances – maximum radiation dose that a responder is allowed to receive

As Low As Reasonably Achievable (ALARA) – use time, distance, and shielding

Radiological Dispersal Device (RDD) – conventional explosive or bomb containing radioactive material

Half life – the time it takes for one half of the radioactive atoms initially present to decay

Stay time – the amount of time a responder is allowed to operate in a radiation field before a pre-defined dose limit is reached

- Dose = Dose Rate x Time
- Ex. 25 rem = 100R/hr x Time
- Time = 25 rem / 100 R/hr = 0.25 hr
- Time = 15 min.

Inverse Square Law:

- Double the distance, ¼ the dose rate
- Halve the distance, four times the dose rate

These definitions are referenced to the Counter Terrorism Operations Support hazmat tech program in Las Vegas, NV

APPENDIX G – RADIATION DOSE STAY TIME

Radiation Dose Rate Guidance

DOSE RATE Recommendations	Values
Contaminated Persons[1]	2 x Background Reading (cpm or µR/h or mR/h)
Limit of Radioactive "Plume" on the Ground or Air[2]	5 x Background Reading (cpm or µR/h or mR/h)
Establish Hot Line[3] CAUTION	1 mR/h to 10 mR/h (0.001 R/h to 0.010 R/h)
Work in Hot Zone CAUTION - DANGER	Hot Line up to 10 R/h (up to 10,000 mR/h)
Turn-Around Dose Rate For NON-Life-Saving[4] DANGER	10 R/h
Turn-Around Dose Rate for LIFE-SAVING[5] DANGER	100 R/h
Life-Saving, Very Short Duration Only (Informed Volunteers)[5] GRAVE DANGER	More than 100 R/h

[1] EPA *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents* EPA 400-R-92-001
[2] DOE *FRMAC Monitoring and Analysis Manual Radiation Monitoring and Sampling*. DOE/NV/11718-181-VOL.1
[3] See guidance from local or state authorities. ASTM (E 2601-08 *Standard Practice for Radiological Emergency Response*), NCRP (Commentary No. 19), and IAEA (EPR-First Responders 2006) recommend 10 mR/h. Many local jurisdictions use 2 mR/h.
[4] NCRP *Management of Terrorist Events Involving Radioactive Material*, NCRP Report No. 138
DOE FRMAC uses 1.5 R/h for Turn-Around, unless otherwise directed. DOE/NV/11718-181-VOL.1
[5] Adapted from ASTM (E 2601-08 Standard Practice for Radiological Emergency Response), Federal Interagency Committee (*Planning Guidance for Response to a Nuclear Detonation*, 2nd Edition), and DOE Los Alamos National Laboratory (LA-UR-99 *Emergency Medical Rescue in a Radiation Environment)*
See guidance from local or state authorities for maximum dose *rate* that can be entered for life-saving activities.

DHS/FEMA and EPA Emergency Worker Dose Guidelines

Dose limit (whole body)		Emergency Action Dose Guidelines Activity performed
5,000 mrem	5 rem	All activities.
10,000 mrem	10 rem	Protecting major property.
25,000 mrem	25 rem	Lifesaving or protection of large populations.
More than 25,000 mrem	More than 25 rem	Lifesaving or protection of large populations, Only by volunteers who understand the risks.

Dose includes sum of external dose and dose due to internal contamination. Dose limits for eyes is 3 x the values listed above. Dose limit for any other organ (including skin and extremities) is 10 times the values listed above.
EPA *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents* EPA 400-R-92-001
DHS/FEMA *Planning Guidance for Protection and Recovery Following Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents*

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STAY TIME TABLE

		DOSE											
		All Emergency Responder Activities Under the Emergency Conditions				Protect Property	Life-Saving		Life-Saving Volunteers Only		Potentially Lethal		
DOSE RATE (Gamma Rate on Meter)		100 mrem 0.1 rem	1,000 mrem 1 rem	2,000 mrem 2 rem	6,000 mrem 6 rem	10,000 mrem 10 rem	20,000 mrem 20 rem	25,000 mrem 25 rem	60,000 mrem 60 rem	100,000 mrem 100 rem	200 rem	300 rem LD 50	600 rem LD 50	1,000 rem LD 100
Bkg	10 µR/h	10000 h											
Above Background	50 µR/h	2000 h											
	100 µR/h	1000 h	10000 h	20000 h									
	500 µR/h	200 h	2000 h	4000 h	10000 h								
	750 µR/h	133 h	1333 h	2666 h	6666 h								
SET UP HOT LINE CAUTION	1000 µR/h 1 mR/h	100 h	1000 h	2000 h	5000 h	10000 h							
	2 mR/h	50 h	500 h	1000 h	2500 h	5000 h	10000 h	12500 h					
	5 mR/h	20 h	200 h	400 h	1000 h	2000 h	4000 h	5000 h	10000 h				
	7.5 mR/h	13 h	133 h	266 h	666 h	1333 h	2666 h	3333 h	6666 h				
	10 mR/h	10 h	100 h	200 h	500 h	1000 h	2000 h	2500 h	5000 h	10000 h			
WORK IN HOT ZONE CAUTION	20 mR/h	5 h	50 h	100 h	250 h	500 h	1000 h	1250 h	2500 h	5000 h	10000 h		
	30 mR/h	3 h	33 h	66 h	166 h	333 h	666 h	833 h	1666 h	3333 h	6666 h	10000 h	
	40 mR/h	150 min	25 h	50 h	125 h	250 h	500 h	625 h	1250 h	2500 h	5000 h	7500 h	
	50 mR/h	120 min	20 h	40 h	100 h	200 h	400 h	500 h	1000 h	2000 h	4000 h	6000 h	10000 h
	75 mR/h	80 min	13 h	26 h	66 h	133 h	266 h	333 h	666 h	1333 h	2666 h	4000 h	6666 h
DANGER	100 mR/h	60 min	10 h	20 h	50 h	100 h	200 h	250 h	500 h	1000 h	2000 h	3000 h	5000 h	10000 h
	200 mR/h	30 min	5 h	10 h	25 h	50 h	100 h	125 h	250 h	500 h	1000 h	1500 h	2500 h	5000 h
	300 mR/h	20 min	3 h	6 h	16 h	33 h	66 h	83 h	166 h	333 h	666 h	1000 h	1666 h	3333 h
	400 mR/h	15 min	150 min	5 h	12 h	25 h	50 h	62 h	125 h	250 h	500 h	750 h	1250 h	2500 h
	500 mR/h	12 min	120 min	4 h	10 h	20 h	40 h	50 h	100 h	200 h	400 h	600 h	1000 h	2000 h
DANGER	750 mR/h	8 min	80 min	160 min	6 h	13 h	26 h	33 h	66 h	133 h	266 h	400 h	666 h	1333 h
	1000 mR/h 1 R/h	6 min	60 min	120 min	5 h	10 h	20 h	25 h	50 h	100 h	200 h	300 h	500 h	1000 h
	1.5 R/h	4 min	40 min	80 min	3 h	6 h	13 h	16 h	33 h	66 h	133 h	200 h	333 h	666 h
	2 R/h	3 min	30 min	60 min	150 min	5 h	10 h	12 h	25 h	50 h	100 h	150 h	250 h	500 h
DANGER	3 R/h	2 min	20 min	40 min	100 min	3 h	6 h	8 h	16 h	33 h	66 h	100 h	166 h	333 h
	4 R/h	90 sec	15 min	30 min	75 min	150 min	5 h	6 h	12 h	25 h	50 h	75 h	125 h	250 h
	6 R/h	60 sec	12 min	24 min	60 min	120 min	4 h	5 h	10 h	20 h	40 h	60 h	100 h	200 h
	7.5 R/h	30 sec	8 min	16 min	40 min	80 min	160 min	3 h	6 h	13 h	26 h	40 h	66 h	133 h
LIFE-SAVING ONLY DANGER	10 R/h	30 sec	6 min	12 min	30 min	60 min	120 min	150 min	5 h	10 h	20 h	30 h	50 h	100 h
	20 R/h	15 sec	3 min	6 min	15 min	30 min	60 min	75 min	150 min	5 h	10 h	15 h	25 h	50 h
	30 R/h	10 sec	2 min	4 min	10 min	20 min	40 min	50 min	100 min	3 h	6 h	10 h	16 h	33 h
	40 R/h	5 sec	90 sec	3 min	7 min	15 min	30 min	37 min	75 min	150 min	5 h	7 h	12 h	25 h
	60 R/h	5 sec	60 sec	2 min	6 min	12 min	24 min	30 min	60 min	120 min	4 h	6 h	10 h	20 h
	75 R/h	5 sec	45 sec	90 sec	4 min	8 min	16 min	20 min	40 min	80 min	160 min	4 h	6 h	13 h
	100 R/h	1 sec	30 sec	60 sec	3 min	6 min	12 min	15 min	30 min	60 min	120 min	3 h	5 h	10 h
VOLUNTEERS ONLY GRAVE DANGER	200 R/h	1 sec	15 sec	30 sec	90 sec	3 min	6 min	7 min	15 min	30 min	60 min	90 min	150 min	5 h
	300 R/h	1 sec	10 sec	20 sec	60 sec	2 min	4 min	5 min	10 min	20 min	40 min	60 min	100 min	3 h
	400 R/h	1 sec	5 sec	15 sec	45 sec	90 sec	3 min	3 min	7 min	15 min	30 min	45 min	75 min	150 min
	600 R/h	1 sec	5 sec	10 sec	30 sec	60 sec	2 min	3 min	6 min	12 min	24 min	36 min	60 min	120 min
	750 R/h	1 sec	5 sec	10 sec	20 sec	45 sec	90 sec	2 min	4 min	8 min	16 min	24 min	40 min	80 min
	1000 R/h	1 sec	1 sec	5 sec	15 sec	30 sec	60 sec	90 sec	3 min	6 min	12 min	18 min	30 min	60 min

Table shows time needed at a Dose Rate (row) to cause a specific Dose (column) and only takes into account external gamma radiation, not internal contamination.
Times are rounded *down* for safety.

Dose Rate colors based on Radiation Dose Rate Guidance table. Dose colors (columns) based on DHS/FEMA and EPA Emergency Worker Dose Guidelines

1 µR = 0.001 mR = 0.000001 R **Natural Background**: about 10 µR/h = 0.01 mR/h = 0.00001 R/h = about 0.25 mR/day

1,000 µR = 1 mR = 0.001 R 1 day = 24 hours 100 hours = 4 days 1 week = 7 days = 168 hours 10,000 hours = 416 days

1,000,000 µR = 1,000 mR = 1 R 1,000 hours = 6 weeks 2,000 hours = 12 weeks 1 year = 365 days = 8,760 hours 20,000 hours = 833 days

Potentially Lethal: For whole body doses received in a short time, the LD50 dose (50% deaths in 30 to 180 days) is about 300 rem without treatment or 600 rem with medical treatment. The LD100 dose (100% deaths) is about 1,000 rem. If the exposure is spread out over a longer period of time (for example, days instead of minutes), the risk of death is lower.

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FIELD TRAINING OFFICER'S (FTO'S) ASSESSMENT

The FTP Assessment is to be completed at the end of each work cycle by the FTO. A copy is to be placed in the back of the Probationary Hazardous Materials Technician's FTM binder, and a copy emailed to the Field Training Supervisor for review.

Probationary Hazardous Materials Technician _____

FTO _____ DATE _____

RATING INSTRUCTIONS: Rate observed behavior on the scale below with 7 being best possible performance and 1 being could not perform at all. You must comment on the most and least acceptable performance of the day. Use category numbers to reference your narrative comments. Check the "N/A" box if a category is not observed.

PERFORMANCE TASKS		**N/A**
1. Readiness to Respond to Calls.....	1 2 3 4 5 6 7	____
2. Field Performance: Stress Conditions.....	1 2 3 4 5 6 7	____
3. Self-Initiated Field Activity/Observation Skills..	1 2 3 4 5 6 7	____
4. Officer Safety.....	1 2 3 4 5 6 7	____
5. Control of Conflict: Verbal Skills.....	1 2 3 4 5 6 7	____
6. Control of Conflict: Physical Skills.....	1 2 3 4 5 6 7	____
7. Radio: Comprehension/Usage.....	1 2 3 4 5 6 7	____
8. Routine Forms: Accuracy/Completeness.....	1 2 3 4 5 6 7	____
9. Report Writing: Organization and Detail.....	1 2 3 4 5 6 7	____
10. Report Writing: Appropriate Time Used.....	1 2 3 4 5 6 7	____
13. Field Performance: Non-Stress.....	1 2 3 4 5 6 7	____
14. Inspection Skills.....	1 2 3 4 5 6 7	____
15. Follow-Up Skills.....	1 2 3 4 5 6 7	____
16. Problem/Solving/Decision Making.....	1 2 3 4 5 6 7	____
KNOWLEDGE		
17. Departmental Policy/Procedures.....	1 2 3 4 5 6 7	____
18. NFPA, Currently Used IFC, County Fire Code	1 2 3 4 5 6 7	____

ATTITUDE

19. Acceptance of Feedback/Following Instructions... 1 2 3 4 5 6 7 ____

21. Attitude Toward Inspection Work..... 1 2 3 4 5 6 7 ____

22. Relationship with Public in General..... 1 2 3 4 5 6 7 ____

23. Relationship with Ethnic Groups..... 1 2 3 4 5 6 7 ____

24. Relationship with Others..... 1 2 3 4 5 6 7 ____

APPEARANCE

25. General Appearance..... 1 2 3 4 5 6 7 ____

NARRATIVE COMMENTS

Most Acceptable Performance_____

_____

_____

_____

_____

Improvement Needed_____

_____

_____

_____

_____

_____

_____

Additional Comments _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Trainee: _____ _____

FTO: _____ _____

(Signature) (Date)

Field Training Program
Critique

Week of: _____ through _____ Date Submitted: _____

Trainee: _____ FTO/Supervisor:_____

This critique SHALL be completed by the trainee for each FTO assignment. All questions SHALL be answered objectively. All problems or concerns identified by the trainee must be accompanied by specific explanations in the space provided.

1. Did the FTO answer all your questions, and explain the answers effectively YES NO

_____

_____

2. Did the FTO afford you adequate opportunity to demonstrate inspection capabilities? YES NO

_____

_____

3. Did the FTO afford you adequate opportunity to demonstrate computer knowledge? YES NO

_____

_____

4. Do you feel that the FTO provided you with a positive training environment? YES NO

_____

_____

5. Do you feel that the FTO treated you with professionalism, courtesy, and respect? YES NO

_____

_____

6. Are you experiencing **any** problems in the field-training program, or with your FTO? YES NO

_____

_____

Additional Comments/Concerns:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

I certify that the answer given by me are true and correct to the best of my knowledge.

_____ _____

Date Trainee

I certify that I have reviewed this critique.

_____ _____

Date Field Training Supervisor

This form to be completed and signed, then forwarded to the Field Training Supervisor. Failure to complete this form may delay your field training program completion.

FIELD TRAINING PROGRAM (FTP) EVALUATION

The FTO Evaluation form is to be completed by the Probationary Hazardous Materials Technician upon completion of the FTO or upon release from HCFMO prior to completion of the FTO.

EVALUATION FORM

Probationary Hazardous Materials Technician: _____ Date: _____

Is there anything in the FTO Program that you were not taught that you feel you should have been?

_____

_____

_____

_____

Do you have any suggestions for improvement in the FTO Program?

_____

_____

_____

_____

During the FTO Program do you feel that the FTO assigned to you did an adequate job in training you? If not explain.

_____

_____

_____

_____

Were you ever placed in an element with someone other than the FTO? If so, which shift, explain.

_____

_____

_____

_____

How do you rate your FTO: 1 being poor and 5 excellent:

1 2 3 4 5

Do you feel that after completing the FTO Program, you can competently perform the duties of a Harris County Fire Marshal Hazardous Materials Technician? If "no" explain:

_____

_____

_____

_____

How do you feel about your chosen career as a Hazardous Materials Technician with HCFMO?

_____
_____
_____
_____

Additional Comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____

FULL RELEASE OF HAZARDOUS MATERIALS TECHNICIAN

HCFMO
Harris County Fire Marshal

POSITION TASK BOOK

HCFMO

Standard for Professional Qualifications for

Hazardous Materials Technician

Task Book Assigned To:

_____
Name

Harris County Fire Marshal's Office
_____
Agency Name Date Initiated

Final Evaluator's Verification
To be completed ONLY when you are recommending the trainee for certification.

I verify that (trainee name) _____ has successfully performed as a trainee by demonstrating all tasks for the position listed above and should be considered for certification in this position. All tasks are documented with appropriate initials.

_____
Signature of Final Evaluator Printed Name of Final Evaluator Date Completed

Agency Certification

To be completed ONLY when you are recommending the trainee for agency credentialing.

I have verified that (trainee name) _____ has met all performance requirements for the position listed above and is eligible for credentialing by this agency in this position. All tasks are documented with appropriate initials.

_____
Signature of Agency Official Printed Name of Agency Official Date Completed