行政院所屬各機關因公出國人員出國報告書
（出國類別：國際會議）

臺美環保首長雙邊會議－汞監測國際合作研討會

服務機關：行政院環境保護署
姓名職稱：朱雨其處長
派赴國家：美國（華盛頓特區）
出國期間：102 年 7 月 15 日至 21 日
報告日期：102 年 9 月 20 日

摘要

　　亞太地區汞監測網夥伴會議(AMMP，Asia-Pacific Mercury Monitoring Partnership)係配合臺美環保業務雙邊合作 20 週年系列活動之一，由我國環保署與美國環保署共同主辦。計 20 餘位各國政府員工及學研機構人員與會，與會各國同意成立亞太地區汞監測網，初期成立專家諮詢會 Scientific Advisory Group (SAG)以實驗性質試辦 3 年，監測項目為雨水汞 mercury wet deposition、大氣的總氣態汞 Total Gaseous Mercury (TGM)或氣態元素汞 Gaseous Elemental Mercury (GEM)、顆粒汞 Particulate Bound Mercury (PBM)、氣態氧化汞 Gaseous Oxidized Mercury (GOM)，1 年後建立站網的監測標準程序；另參與會員皆有大氣、沈降、土壤、底泥、魚類及人體的汞監測資訊及技術之需求，以提昇監測能力；美國環保署及 NADP 願意提供資料、訓練課程、技術移轉甚至監測儀器之支援，而我國中央大學與日本願意協助其他夥伴進行雨水汞樣品之分析。冀能透過區域夥伴關係，進行監測數據共享、技術交流以提昇東亞地區之汞監測能量。

　　另 7 月 18 日由美國環保署環境資訊處 Roy Chaudet 及 Wayne Davis 二位邀集安排，於美國環保署雷根大樓(RRB)3 樓國際會議室舉行，約 12 人與會，主要討論議題重點為：1.資料視覺化(data visualization)及地理資訊系統、2.美國環保署「企業架構(Enterprise Architecture, EA)」、3.資料標準及系統註冊機制(System of Registry, SoR)、4.業務智慧分析中心(Business Intelligence Analytics Center, BIAC)。雙方對當前資訊發展趨勢及資訊業務推展上所面臨的問題，充分交換意見及分享經驗。學到很多，期望將來能應用在本署資訊業務推展。

目錄

一、會議背景及目的

　　近年來由於亞太地區經濟快速發展，人為產生的汞污染物藉由氣流長程傳輸影響空氣品質，或經由降雨進入水體、魚體，對環境影響深遠，引發各國重視大氣汞污染跨境傳輸的監測課題。

　　我國對大氣汞的監測向來積極，2007 年在海拔 2,862 公尺的鹿林山設置連續自動監測大氣汞的儀器，由於臺灣位於亞洲氣流系統之下風處，監測數據極具代表性。透過臺美環保技術合作協助，鹿林山測站目前已分別加入全球大氣汞監測網(AMNet)及美國國家汞沉降監測網(NADP)，監測技術與世界先進國家同步。本署 2012 年 9 月於臺北舉辦大氣汞研討會，與會各國討論後，認為汞是一個生命週期長的污染物，對人體、生態會造成危害，有必要瞭解其環境濃度及流布情形、訂定管制策略、控制人為排放量。

　　本次會議主要係配合臺美環保業務雙邊合作 20 週年系列活動，由我國環保署與美國環保署共同主辦。美方主要之協力學研機構為美國伊利諾大學主持之美國國家汞沉降監測網(NADP)，我國則由中央大學大氣科學系協助相關研究及技術工作。本次會議名稱訂為「亞太地區汞監測網夥伴會議(AMMP，Asia-Pacific Mercury Monitoring Partnership)」，出席國家除我國及美國外，尚有加拿大、日本、韓國、印尼、泰國及越南等計 20 餘位各國政府員工及學研機構人員與會，冀能透過區域夥伴關係，進行監測數據共享、技術交流以提昇東亞地區之汞監測能量。其中印尼、泰國及越南代表係由美國環保署與各該國雙邊合作計畫所邀請。

　　除了會議例行之技術課題研討外，本次會議尚有一項特別的活動：汞監測儀器捐贈。美國環保署將其原支持 NADP 的 2 套汞監測儀器捐給印尼及越南，希望能協助該等國家建立汞監測工作。這項捐贈儀式邀請本署沈署長致詞，並為見證人。會議結束後，由美國 NADP 技術人員及我國中央大學許桂榮教授共同組裝儀器以快遞郵寄受贈國家。其次，會議第 2 天安排與會人員參訪美國海洋大氣署(National Ocean and Atmospheric Agency, NOAA)及美國環保署設於華府週邊的大氣背景測站相關設施。會議第 3 天主要討論與會各國後續合作模式及未來儀器操作、資料品質保證及分享等事宜。

二、會議過程及內容重點整理

（一）臺美合作計畫年度成果回顧

7 月 16 日上午由本署沈署長與美國環保署國際合作處 Jane Nishida 共同主持雙邊合作計畫年度成果回顧會議，其中與本處業務相關者計有 2 項：(1)環境資訊發展(2)大氣汞監測，分別由美國環保署 Wayne Davis 及 David Schmeltz 二位發表簡報，（簡報資料如附件 1）。

（二）汞監測儀器捐贈儀式

年度成果回顧會後，由美國環保署將其原支持 NADP 的 2 套汞監測儀器捐給印尼及越南，希望能協助該等國家建立汞監測工作。美國環保署有感於近年與我國在大氣汞監測方面合作成果斐然，特別邀請本署沈世宏署長擔任見證人並致詞（致詞稿如附件 2）。

（三）美國環保署簡報 AirNow 系統（簡報如附件 3）

7 月 16 日下午由美國環保署 Phil Dickerson 先生向本署沈署長簡報 AirNow 系統。本系統係美國環保署支持民間科技公司(Sonoma Technology, Inc.)所發展，主要運用開源軟體(open sources)發展一系列模組化的軟體，藉以接收彙集美國各州政府所設置的空氣品質監測站資料(美國環保署本部並未設有常規型測站)，而後計算 AQI(Air Quality Index)值，並即時上網以圖形介面展示。

AirNow 的資料蒐集與發布，其屬性類似一種「志願參與」及「加值服務」的模式。美國環保署並未強制各州政府應將監測資料傳至 AirNow，所以目前並非所有州政府都參與 AirNow。但美國環保署另有法規要求各州政府應將空氣品質監測資料傳至另一系統-- AQS(Air Quality System)，是以此二項系統彼此間資料並不一致，Phil Dickerson 先生評估二者一致性約 80%，但其認為 AirNow 與 AQS 性質不同，其資料差異並不影響相關業務運作。對公眾而言，由於 AirNow 的使用者介面較為友善，用到 AQS 的機會不多，是以也不會造成混淆。

其次，AirNow 另與聯邦政府其它機關合作，例如美國太空總署(NASA)及美國大氣海洋總署(NOAA)，結合不同機關的觀測數據及大氣預報資料，提供全美各地 AQI 及臭氧濃度預報資料。根據簡報資料中國大陸上海市環境保護局及部分南美洲國家已導入 AirNow(據瞭解約需支付 30 萬美金)。

綜觀 AirNow 系統與本署現行空氣品質監測網所提供之服務大部分相類似，加以 AirNow 使用 AQI 指標，與我國使用的 PSI 指標不同；再者，我國現行測站多由本署設置，地方政府設置自動測站者不多，已設置者其監測作業及數據的品保品管水準尚待確認，是以現階段倘要全面導入 AirNow 系統恐非適宜。但 AirNow 系統有些功能模組值得借鏡，例如以圖形展示方式表現預報及即時濃度數據，有助於改善系統友善程度。其次，利用衛星資料與地面監測數據相互融合(data fusion)，對提升空氣品質預報似亦有助益(特別是 $PM_{2.5}$ 濃度的解析)，對此課題另於 7 月 18 日與參與本計畫的 NASA 科學家-Dr. Allen Chu 討論(詳後述)。

（四）亞太地區汞監測夥伴合作會議(7 月 17 日至 19 日，議程如附件 4)

「亞太地區汞監測夥伴合作會議」係由本署與美國環保署於美國華盛頓特區共同舉辦，共有來自我國、美國、加拿大、日本、韓國、泰國、越南及印尼等國政府及學術研究部門 20 餘位代表與會，這項會議以亞太地區汞監測合作為主軸，分別就大氣汞及濕沉降之汞監測技術發展、監測數據品保品管、資料解析及分享等課題廣泛討論。

7 月 17 日上午沈世宏署長於會議前先與美國環保署主管空氣與輻射業務的助理署長 Joel Beauvais 會面，雙方晤談氣氛融洽。隨後雙方共同進入會場(美國環保署東側大樓 4110 會議室)。會議開始由 Joel Beauvais 助理署長先行致詞。渠以地主身分，歡迎與會人員，並對近年本署與美國環保署合作大氣汞監測之成果給予高度評價，另期許未來本署在東南亞地區的大氣汞監測能扮演類似樞紐(hub)角色。

本署沈世宏署長隨後以會議貴賓身分致詞，沈署長除陳述我國在汞監測及管制工作方面的成果外，亦表達我國願意與美國環保署合作，提供本署建置大氣汞監測經驗，提供技術合作與經驗分享平台，協助東南亞地區國家建置汞監測的技術能量(署長致詞稿如附件 5)。雙方致詞後，全體與會人員合影留念。隨後，由美國 NADP 計畫主持人 David Gay 教授及美國環保署 David Schmeltz 先生就大氣汞監測之現況及未來發展藍圖簡報。本署沈署長於簡報後因後續另有行程，先行離開。

其後議程分別由與會人員報告各國在汞監測工作現況(各國簡報資料如如附件○)。其中以我國、加拿大、日本及韓國等在此領域已有相當成果，其它東南地區國家似尚屬起步階段。與會美國大氣海洋署專家表示，此會議未來宜邀請中國大陸與會，以期整體監測網路完整。唯據 David Gay 及 David Schmeltz 表示，渠等嘗於本年 5 月間訪問中國

大陸，並提出邀請，唯陸方態度消極，致未能派員與會。

本日會議後，本署於美國傳送資料回國，發布新聞如附件 6

7 月 18 日會議安排參訪美國環保署及美國大氣海洋署設於華府近郊之大氣背景測站(本人因另安排與美國環保署環境資訊處人員及美國太空總署 Dr. Allen Chu 會面討論相關議題合作方式，未參與參訪，討論紀錄詳後述)。

7 月 19 日與會人員討論未來具體之合作方式交換意見，綜整會議主要內容及結論如下：

1. 與會各國同意成立亞太地區汞監測網，初期成立專家諮詢會 Scientific Advisory Group (SAG)以實驗性質試辦 3 年，監測項目為雨水汞 mercury wet deposition、大氣的總氣態汞 Total Gaseous Mercury (TGM)或氣態元素汞 Gaseous Elemental Mercury (GEM)、顆粒汞 Particulate Bound Mercury (PBM)、氣態氧化汞 Gaseous Oxidized Mercury (GOM)，1 年後建立站網的監測標準程序；另參與會員皆有大氣、沈降、土壤、底泥、魚類及人體的汞監測資訊及技術之需求，以提昇監測能力;美國環保署及 NADP 願意提供資料、訓練課程、技術移轉甚至監測儀器之支援，而我國中央大學與日本願意協助其他夥伴進行雨水汞樣品之分析。

2. 亞太地區汞監測網將於 2013 年 9 月 15 日前，擬定一些資訊 (information package)，以鼓勵其他國家加入，內容包括：
   ▶ NADP 的邀請函及加入站網的好處
   ▶ 監測網協議書
   ▶ 簡短的汞問題科學報告
   ▶ 此次研討會成果報告
   ▶ 以美國環保署檢測方式為基礎的汞監測標準方法

3. 類似本次型態的會議，未來有必要持續進行，瞭解亞太地區汞監測網的推動情形，初步規劃 4 天，開會地點預定於東南亞國家。

（五）**與美國環保署環境資訊處(Office of Environmental Information)研商未來環境資訊系統技術合作事宜(7 月 18 日 8:30am – 13:30pm)**

研商會議由美國環保署環境資訊處 Roy Chaudet 及 Wayne Davis 二位邀集安排，於美國環保署雷根大樓(RRB)3 樓國際會議室舉行，並與美國環保署設於北卡的電腦中心人員以電話連線會議。共有環境資訊處及該處協力廠商約 12 人與會，主要討論議題重點摘述如下：(詳細議程及討論資料如附件 7)

1. 資料視覺化(data visualization)及地理資訊系統：美國環保署地理資訊系統發展甚為成熟，資訊部門與業務部門之間分工亦甚明確。資訊部門主要提供整體 GIS 的基礎架構及服務，包括部署適當的工具及資料，而業務部門則根據其需求，在基礎設施上發展 GIS 應用系統。通常業務單位各自委外建置業務性之地理資訊系統，是以難免有重複或與基礎設施標準衝突情況。美國環保署組織 GIS Management Committee，藉以處理各單位間地理圖資之管理工作，委員會由資訊部門、業務部門及 10 個分署派員組成，委員會主席則由成員互選，每一任 2 年。類似的組織架構值得借鏡，但如何落實，避免流於形式，則需要細心考量(美國環保署人員也承認以這種方式推動仍有若干盲點，但短時間尚未有更完善之管理模式可供採行)。

2. 美國環保署的「企業架構(Enterprise Architecture, EA)」：企業架構是美國聯邦政府近年大力推動的資訊基礎措施之一，其性質是為組織的資訊系統發展提供整體藍圖及架構，是以聯邦各機構資訊部門均設有資訊架構師(Information Architect)職位。美國環保署資訊架構師 Soni 說明該署現行 EA 的制定過程及其定位，但也表示，由於美國環保署是 loosely control 的機關，各項計畫之主導權在各個計畫主持人，是以難免各計畫間對資訊系統或技術的運用，會發生重複或不一致的情況，Soni 先生認為這是大型企業運用資訊技術的必然現象，但是 EA 的價值卻不容置疑。
   我國政府目前尚未有類似美國聯邦政府的作法，未來適當時機或可採行，但國內資訊產業界對資訊架構師的培訓及其專業量能，可否承擔公部門及企業界的需求，則有待觀察。

3. 資料標準及系統註冊機制(System of Registry, SoR)：美國環保署對各單位間共用資料項目，訂有嚴謹的標準，而且充分落實。例如對列管設施的「地址」，各類管制性化學品的名稱等，充分反應各單位對資料標準的重視(根據美國環保署人員陳述，承辦該署業務計畫的廠商，對資料標準的掌握及「守規距」的程度，主要也看業務單位重視程度，並不一致，但整體而言，其成效值得肯定)。
   SoR 的性質類似美國環保署資訊系統的「型錄(catalog)」，在 SoR 上註冊的系統，通常資訊處每年會進行評估，並落實採行系統生命週期(system life cycle)，利用率欠佳或已逾時效的系統，適時退場，以有效利用資訊資源。美國環保署人員不諱言，部分業務單位為避免其系統「評價不佳」，規避註冊，現階段資訊處尚難處理這類行為，但未來他們考量對未註冊系統在資源配置上給予限制。

4. 業務智慧分析中心(Business Intelligence Analytics Center, BIAC)：這項服務是美國環保署資訊處近年新推行的措施，但其成效尚待評估，而且成本甚高。其主要作法係資訊處提供各式資料分析的工具和統一作業平台，供各業務單位就其需求加以運用。此作法在私人企業近年蔚為風氣，但在公部門能否有效推行，需要再觀察。如同美國環保署所稱，公部門業務單位倘有資料分析需求，大抵委託專業公司處理，鮮少公部門人員自身「親力為之」，即然已委外處理，則 BIAC 所提供的分析工具及平台要服務誰呢？受委託的廠商嗎？美國環保署資訊處人員說他們現在也沒有答案，還在模索。

同美國環保署資訊處同仁將近 5 小時的討論，是個美好的經驗。雙方對當前資訊發展趨勢及資訊業務推展上所面臨的問題，充分交換意見及分享經驗。學到很多，期望將來能應用在本署資訊業務推展。

（六）與美國太空總署 Dr. Allan Chu(朱定中博士)晤談記要(7 月 18 日 2:30pm – 5:00pm，Hyatt Hotel, Bethesda, MD, USA)

朱定中博士，臺灣大學大氣科學系畢業後負笈美國，學成後留美工作，目前係美國巴爾地摩大學與美國太空總署合聘之學者，其專長在衛星觀測氣膠光學厚度(Aerosol Optical Depth, AOD)，結合光達資料，反衍大氣中空氣污染物濃度 -- 特別是 $PM_{2.5}$。前述美國環保署 AirNow 系統提到的衛星資料融合技術，即屬與朱博士合作之課題。

談到以衛星觀測資料反衍 $PM_{2.5}$ 濃度，朱博士很坦誠地說，衛星資料有侷限性，目前尚有許多難題待克服，不宜期待太高。首先，衛星資料無法反衍夜間的污染物濃度；其次，雲遮蔽效應更是衛星資料可用率的一大障礙。朱博士認為衛星資料反衍的 $PM_{2.5}$ 濃度只適宜用在預報模式效果的評估和調整，無法認定或評斷某個地區的 $PM_{2.5}$ 濃度。

同朱博士的晤談，釐清了衛星遙測技術量測空氣污染物濃度的真正作用，國內少數學者及團體輒以「美國太空總署的資料，顯示臺灣地區的 $PM_{2.5}$ 濃度...」，作為其評判或論述基礎，顯然是對衛星資料的誤解。晤談結束前，我誠懇建議朱博士，身為國際知名的衛星資料運用專家，可否利用「適當的管道」，對一般大眾(包括前述的「少數學者及團體」)說明清楚衛星資料的侷限和其實際的作用，朱博士笑而未答。

三、參加會議心得及建議

（一）加強與美國環保署合作，扮演汞監測活動東南亞地區的樞紐。

日本、韓國等東北亞國家已發展完整的汞監測站網，投入監測人力亦多，技術層次亦較泰國、越南、印尼等東南亞國家成熟；東南亞國家普遍尚未成立汞監測站，故美方希望藉由雨水採樣儀器之捐贈，可以提高東南亞國家進行雨水汞、大氣汞之監測意願；我方分析技術亦高於東南亞國家，倘未來亞太地區汞監測夥伴合作關係成立，我國或可協助東南亞地區國家執行汞樣品分析，建立我國汞監測技術在東南亞地區之信譽，進而拓展我國環境檢測產業在東南亞地區商機。

（二）利用水俁公約(Minamata Convention)，促成汞監測技術國際接軌

國際間對於汞所引起之水俁病極為重視，今年 1 月 154 個聯合國會員國已於瑞士就水俁公約(Minamata Convention)內容進行討論，預計今年 10 月於日本熊本市進行水俁公約之簽署，主要就汞之使用、運送、處理等作限制性管制；我國雨水汞監測由空保處主政已執行多年，大氣汞監測自鹿林山測站於 2006 年設站以來，亦累積諸多監測資料，去年我國還通過 NADP 大氣汞低濃度(ng/m3 至 pg/m3 等級)盲樣測試，故 NADP 對我國數據品質良好深感認同，目前已有多個國際組織(如歐盟 GMOS)採用我國數據進行分析、模擬。一旦水俁公約簽署後，我國可提供現有的汞監測數據、協助分析東南亞國家樣品、訓練東南亞國家分析人員，成為為亞洲地區的汞監測技術支援中心。

（三）持續與美國環保署交流合作環境資訊發展技術，建立未來「環境資源部」企業資訊架構

美國聯邦政府責成各機關發展「企業資訊架構」並定期檢視，這種作法不僅符合現今資訊管理技術趨勢，長期而言，更可有效降低資訊資源的重複投資，奠定資訊系統整合的基礎。我國公私部門對這項技術，目前並未投入適當資源，再者，國內資訊科技業界對這項技術量能的建立，亦未關注，殊為可惜。考量未來組改後，環境資源部之規模及複雜程度將遠超過本署現行資訊能量所能負荷，著有必要趁此時機，針對環境資源部之企業資訊架構，預為籌謀，以因應環境資源部成立後，得以充分運用資訊科技，協助環境保護及資源保育業務推展。

（四）加速本署資訊基礎服務設施雲端化，落實節能減碳

雲端技術在國內「談」了相當時日，但是「真正落實採行」的尚不多見，尤其在公部門，由於採購程序及相關規定的繁雜及限制，執行上難免有所掣肘，致進度難有進展。

美國環保署今年初將其電子郵件等共用性基礎資訊服務，全數移轉至微軟之雲端平台。據瞭解，此舉不僅大幅降低該署資訊作業營運成本，同時有效提昇資訊作業的靈活及彈性，成效斐然。

本署電子郵件、共用硬碟等基礎服務的承載設備，多已陳舊，本署二年多前即思規劃汰換，唯以組改進度未能明朗，致遲遲未能施作。晚近類似之資訊基礎雲端服務日趨普遍，加以組改時程日漸趨近，本署宜趁此時機，研擬適當之採購計畫，將電子郵件，共用硬碟等服務移往雲端，估計此舉可減少約 10 部伺服器及相關軟體之購置，加上後續的操作維運費用，採用雲端服務約可節省三分之一的經費，宜儘早開展。

附件 **1**、美國環保署大氣汞監測簡報

Asia-Pacific Mercury Monitoring Workshop

David Schmeltz
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Washington D.C., USA
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July 17-19, 2013
U.S. EPA
Washington D.C.

EPA United States Environmental Protection Agency

Overview

- Context
  - Highlights of the September, 2012 Atmospheric Mercury Monitoring Workshop
  - New development: Minamata Convention

- Review workshop agenda
  - Objectives and outcomes
  - Activities over the next three days

2012 Atmospheric Mercury Monitoring Workshop

- Organized by Taiwan EPA, National Central University, U.S. EPA, and NADP, September 2012, Taipei , Taiwan

- Science and policy experts from Canada, Indonesia, Japan, Korea, Taiwan, Thailand, and the U.S.

- Exchanged information on programs in North America and Asia that monitor atmospheric mercury concentrations, wet/dry mercury deposition, and related atmospheric pollutants

Key Findings and Needs

1. Range of mercury monitoring capabilities across the Asia-Pacific region

2. Many scientific papers published; but limited data available
   - No regional database of measurements

3. Improve availability of accurate and comparable mercury monitoring data for analysis and modeling of Trans-Pacific atmospheric mercury transport

4. Improve coordination of monitoring activities in the region

5. Assist countries with limited mercury monitoring experience (build capacity)

Opportunities for Asia-Pacific cooperation

Mercury measurements in East Asia

Preliminary Monitoring Summary

	Speciated Hg	TGM	Wet Hg Dep	EANET
Indonesia				5
Japan	5	1	3	12
Korea	3	10	6	3
Taiwan	1		12	
Thailand				6
Vietnam				2
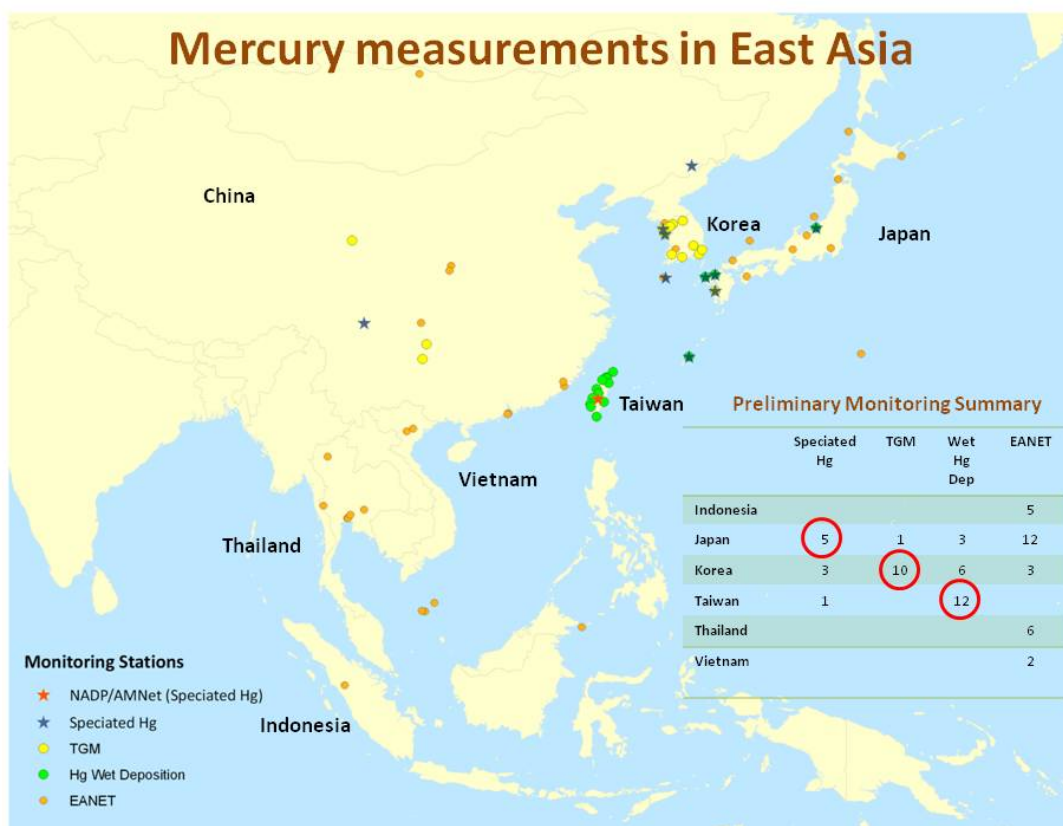
Global Mercury Observation System – Ground Based Sites
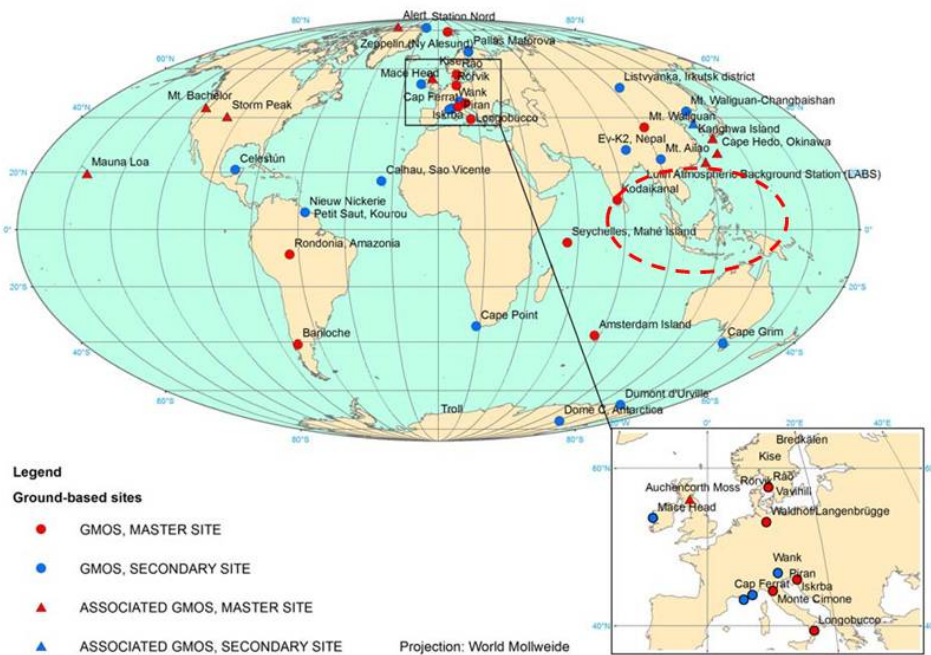
Policy Context: Minamata Convention

- Governments agreed to a global, legally-binding treaty to prevent emissions and releases

- Provides controls and reductions across a range of products, processes and industries where mercury is used, released or emitted

- Article 20 – Research, Development and Monitoring
    - Cooperate to develop and improve capabilities to assess the impact of mercury on human health and the environment
    - Harmonize methods; build on existing monitoring networks and research programs
- Article 23 – Effectiveness Evaluation
    - Evaluate the Convention's effectiveness 6 years after treaty goes into force
    - Comparable monitoring data on the presence and movement of mercury in the environment

January 2013

Objectives of the 2013 Asia-Pacific Mercury Monitoring Workshop

1. Share latest information from each partner agency

2. Review proposal reach some agreement on monitoring objectives and major design elements for an operating (pilot) network for the region

3. Devise a preliminary plan for deploying wet deposition collectors in Southeast Asia

4. Establish a steering committee and plan for next steps and next meeting

Roadmap of the 2013 Asia-Pacific Mercury Monitoring Workshop

Day 1 – Wednesday, July 17, 2013

1. Vision for an Asia-Pacific mercury monitoring network

2. North American experience and perspectives on monitoring

3. Update on mercury and related monitoring in Asia

4. Review and (round robin) discussion of vision and initial proposal for collaborative mercury monitoring in the region

Roadmap of the 2013 Asia-Pacific Mercury Monitoring Workshop

Day 2 – Thursday, July 18, 2013

1. Field trip (weather permitting) to the NADP monitoring station at Beltsville MD; overview and training on Hg wet deposition and speciated atmospheric Hg measurements

2. Working lunch at NOAA's Center for Weather and Climate Prediction, College Park, MD; presentation on the uses of atmospheric Hg data

3. Afternoon discussion on how an Asia-Pacific network would operate
   - Overview of monitoring proposal; review and discussion of specific points, with an objective of reaching group agreement

NADP/MDN Monitoring Location MD99

NOAA, NCWCP, College Park, MD

Roadmap of the 2013 Asia-Pacific Mercury Monitoring Workshop

Day 3 – Friday, July 19, 2013

1. Continued discussion at EPA offices -- How would an Asia-Pacific Network operate?

2. Summary and next steps

3. Review of action items and commitments

Welcome to Washington D.C.!

附件 **2**、署長汞監測儀器致贈儀式見證致詞

Minister Stephen S. H. Shen's Address at the
Presentation of Mercury Monitoring Equipment to Southeast Asian Countries

Honored guests, ladies and gentlemen: Good afternoon.

It is truly an honor to attend and witness this historical ceremony for the donation of mercury monitoring equipment. I believe this equipment will launch a great new beginning and inspiration for mercury monitoring and related environmental protection jobs for Southeast-Asian countries. Meanwhile, I expect that global environmental protection affairs will advance forward through future technical exchanges and information sharing related to mercury monitoring in the Asia-Pacific region.

On behalf of the Taiwan EPA, I express great admiration for the U.S. government's generosity and enthusiasm in support of mercury monitoring in the Asia-Pacific region. On this occasion, I would like to briefly the progress of atmospheic mercury monitoring in Taiwan. In the process of a cooperation activity with the U.S., our technicians took part in an on-the-spot investigation at the　Mauna Loa Observatory, Hawaii, in 2005, to observe and learn about the operation of an atmospheric mercury monitoring station.

Then in 2006, we established the Lulin Atmospheric Background monitoring station in Taiwan, to collect information for long-range transport of atmospheric mercury. The Taiwan EPA has been teaming up with National Central University to receive America's experience and technology transfers. We have established comprehensive standard operating procedures, data quality controls and assurances, and kept all the equipment maintenance records related to running the station smoothly.
In 2011, the Lulin Atmospheric Background station became the first Asia-area station to join AMNet, via the invitation of the NADP (National Atmospheric Deposition Program). At the same time, we started measuring mercury wet-deposition. Gradually, we also began cooperating with the USEPA, NASA, and NOAA. The Taiwan EPA has also joined some international monitoring networks.
.
The Taiwan EPA runs a nationwide mercury wet deposition monitoring network consisting of 12 sampling stations that collect rain drops for total mercury analysis. The network's objective is to develop a national database of mercury concentrations in precipitation and wet

deposition fluxes. The data are used to figure out spatial and temporal trends of wet deposition and to assess mercury contributions from regional and long-range transports.

The Taiwan EPA and the USEPA are co-hosting this ceremony in order to sincerely invite you to join the Asia-Pacific mercury monitoring partnership via equipment donation. The U.S.A. has more than 20-years of experience in establishing stations, and has developed comprehensive SOPs on equipment set-up and maintenance, as well as data quality control and assurance. We will share data and technologies with each other in the partnership. It is beneficial to understand mercury characteristics and its impact on the Asia-Pacific region. We desire to enrich the regional partnership in order to help solve the global environmental challenges which each country is facing.

I am happy to see you join the Asia-Pacific mercury monitoring partnership, and I am very pleased and honored to be a witness.

Thank you!

AirNow Program and Air Quality Management

Phil Dickerson[1], Jackie Fu[2], Alan Chan[3], and Tim Dye[4]

[1]AirNow Program Director, U.S. Environmental Protection Agency (EPA), Research Triangle Park, North Carolina, USA

[2]Chief Engineer, Ph.D., Shanghai Environmental Monitoring Center, Shanghai, China

[3]Manager, Forecasting and Public Outreach Operations, Sonoma Technology, Petaluma, California, USA

[4]Senior Vice President, Sonoma Technology, Petaluma, California, USA

STI-5376

Outline

- AirNow program overview
- AirNow as an air quality management (AQM) tool in Asia
- Case study – Shanghai pilot
- Future of the program
- Summary

2

Overview – What is AirNow?

AirNow is a framework for acquiring and distributing air quality information

- Started in the Northeastern U.S. in 1997
  - Gathers data provided by 130+ federal, state, and local air quality agencies
  - Educates the media and public
  - Communicates air quality information using the Air Quality Index (AQI)
  - Provides data to other systems

America's "go to" resource for current and forecasted air quality information
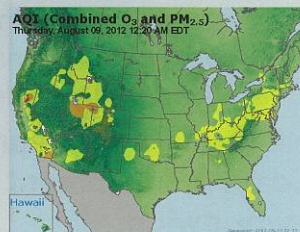
AirNow

3

Overview – What is AirNow?

AirNow was expanded, enhanced, and re-engineered for use around the globe

- US$1.5 million system funded by U.S. EPA Group on Earth Observations (GEO)
  - Identical to the U.S. system
  - Adoptable by other countries/regions
  - Launched first international pilot (AirNow-I) in Shanghai, China, for 2010 World Expo

A key tool for improving air quality data management and governance worldwide

AirNow
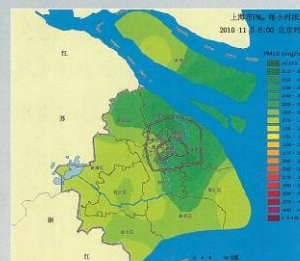
4

Overview – Components (3 of 5)

Inputs → Processing, Quality Assurance, Reporting → Outputs

AIRNow Data Management System — **DMS** — Data Processing, Quality Control, Data Storage, Graphing

AIRNow Information Management System — **IMS** — Mapping, File Creating, Scheduling, Control of Web Services

AIRNow-I Databases

Data Files

Web Services

Maps, Image Layers

- = file
- = web service
- = module
- = data/info transfer
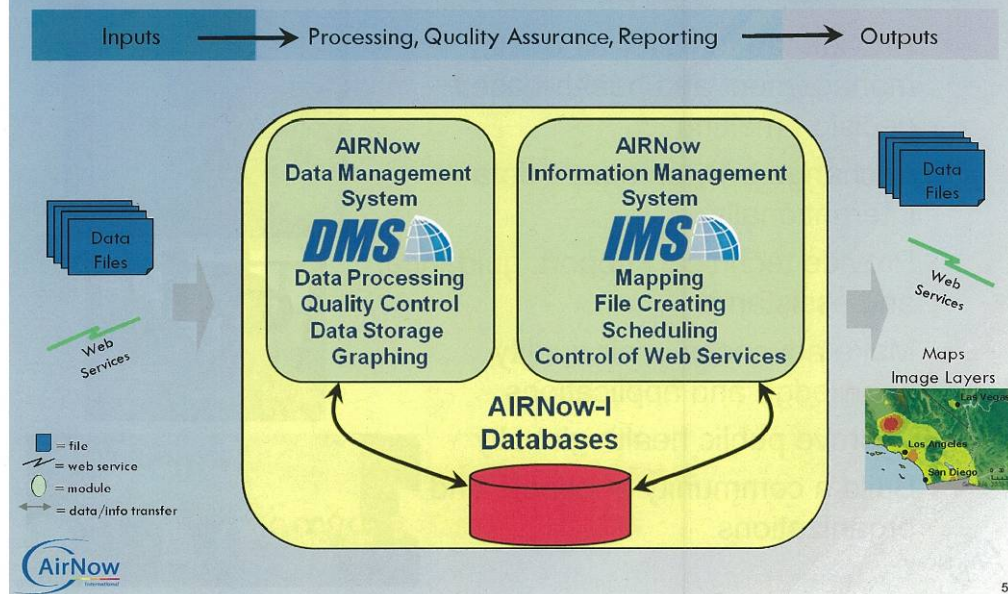
5

Overview – Mission and Objectives (4 of 5)

- Provide the tools for air quality management and health-based decision making
- Exchange environmental data internationally
- Provide technical support, guidance, and assistance
- Make advances in air quality knowledge and applications
- Improve public health globally
- Build a community of people and organizations

6

20

Overview – Technical Elements (5 of 5)

IMS DMS

Software

Support services

Software modules and enhancements

Forecasting Support

Training

Model (future)

Data Exchange

Data sharing

Knowledge and Technical Exchange

Technical collaboration and training

AirNow

7
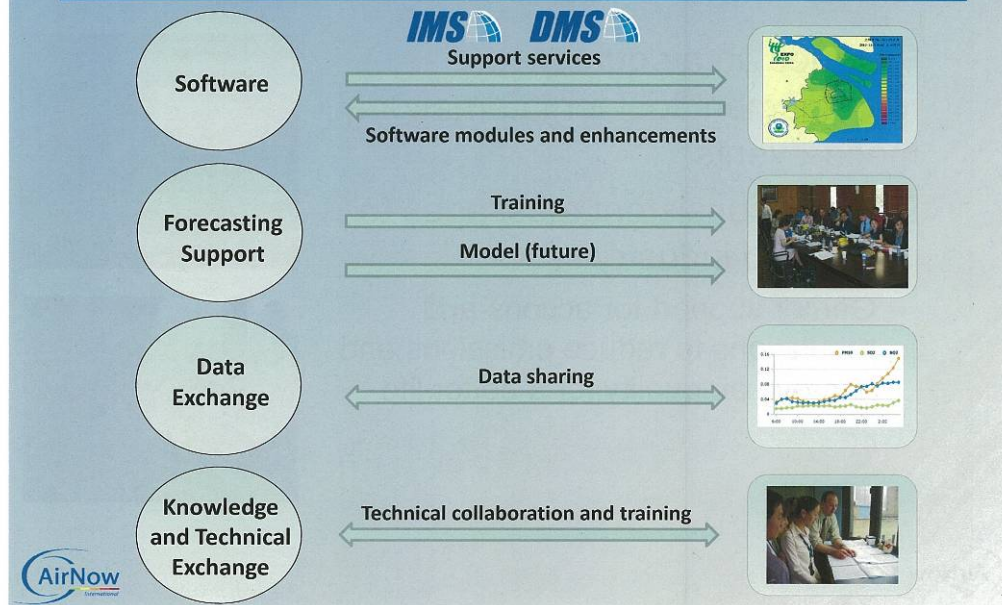
AirNow as an AQM Tool in Asia (1 of 2)

- Provides an air quality management tool for international mega-events
- Delivers consistent messages to public and industry
  - Garner support for actions and regulations to reduce emissions and improve air quality for a better life

AirNow

8
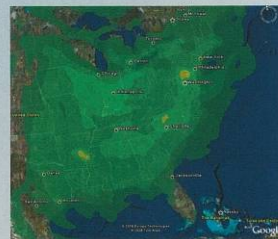
AirNow as an AQM Tool in Asia (2 of 2)

- Promotes sharing of data to
  - Increase air quality knowledge of all parties
  - Leverage infrastructure and expertise
  - Improve existing models, data/decision systems, mapping, and forecasts
  - Improve accuracy of national and regional data in Asia
- Strengthens partnerships (internal and external)

AirNow International

9

Case Study – Shanghai Pilot (1 of 3)

Concept and Prototype	Development	Beta Release and Testing	Final Release
2007	2008	2009	2010+

• Created specification document
• GEO-IV Plenary
	• AirNow-I system
	• Shanghai collaboration
	• MOUs signed
	  • U.S. EPA – Shanghai EPB
	  • Shanghai EPB – Shanghai Met. Bureau
		• Completed AirNow-I
		• Launched AirNow-I in United States
		• Tested AirNow-I in Shanghai
			• Operation at World Expo in Shanghai
			• Build and grow community

AirNow International

10

22

Case Study – Shanghai Pilot

- Created a stable data management infrastructure for new public reporting initiatives by Shanghai
- Promoted technical and technological advances in air quality applications
- Fostered regional cooperation and collaboration in the Yangzi River Delta region

11

Case Study – Shanghai Pilot

AirNow-I products provided to the 2010 World Expo

12

Future – Expand to Other Regions (1 of 3)

Jiangsu and Zhejiang Provinces

Monterrey, Mexico (second pilot)

Sao Paulo, Brazil

13

Future – Data Fusion (2 of 3)

Background

- AirNow observations are limited in some areas for representative data mapping
- Increasing ground observation coverage can be costly
- Fusion of ground data with NASA satellite data can fill gaps and improve the quality of AirNow maps
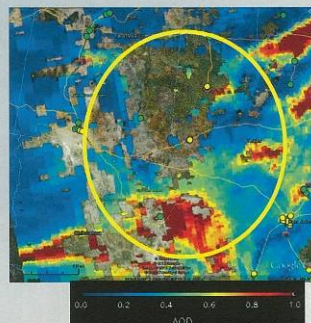
14

Future – Data Fusion (3 of 3)

AirNow PM₂.₅ Observations Satellite-Estimated PM₂.₅ Fused PM₂.₅
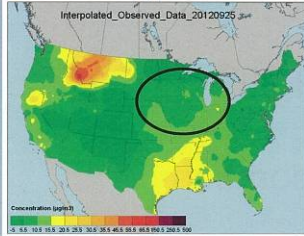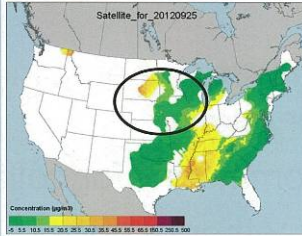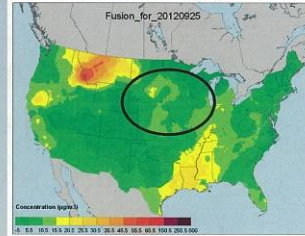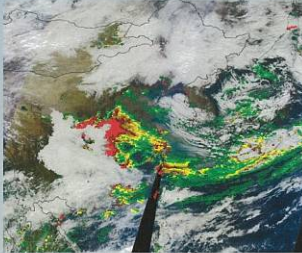
Aerosol Optical Depth   Observations
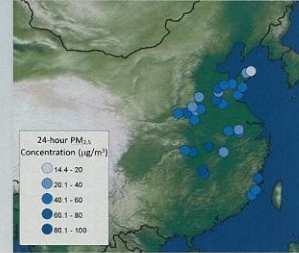
November 14, 2012
Potential application of
satellite aerosol optical
depth data for improving
ground-level air quality
observational data

Summary

AirNow

- Providing software for acquiring and publishing air quality
- Creating a community for collaboration
- Expanding to other regions
- Developing new features

附件 4、亞太地區汞監測夥伴合作會議

Asia-Pacific Mercury Monitoring Network Workshop

Objective: Develop an atmospheric mercury monitoring network operating plan for the Asia-Pacific region. The plan would consist of shared monitoring objectives, major design elements, and implementation milestones for an Asia-Pacific mercury monitoring network. The plan is envisioned as a written document that attendees can use to advance regionally-consistent mercury monitoring in their countries.

Date		Day 1 Wednesday, July 17, 2013 U.S. EPA, EPA East Building, Room 4110	
Start	End	Topic	Speaker/Session Host
8:30	8:45	Opening Remarks by U.S. EPA	Mr. Joel Beauvais, Associate Assistant Administrator for Air and Radiation, U.S. Environmental Protection Agency
8:45	8:55	Special Remarks by EPA Taiwan	Honorable Stephen Shen, Minister, Environmental Protection Administration, Taiwan
8:55	9:05	Welcome and Group Introductions by NADP	Dr. David Gay, NADP
9:05	9:15	Group Photo *Representatives from NADP will have an information booth, including atmospheric mercury instrument and mercury wet deposition collector on display* *Location EPA East Room 4110*	
9:15	9:30	Break	
9:30	9:50	Mercury Monitoring Workshop Overview	Mr. David Schmeltz, U.S.EPA
9:50	10:20	Vision for an Asia-Pacific Mercury Monitoring Network	Dr. Guey-Rong Sheu, National Central University Dr. David Gay, NADP
10:20 – 11:20		Session I: The North American Experience and Perspectives	Mercury monitoring in Canada Dr. Pierrette Blanchard, Environment Canada The wisdom of networking: The World Meteorological Organization (WMO) & standardized global precipitation chemistry measurements Mr. Richard Artz, NOAA The NADP: A case study of transparent governance, standardized operations, & reliable monitoring results for North America Dr. David Gay, NADP

11:20 – 12:20		**Session II:** **Atmospheric Mercury Monitoring in Asia**	**Update on recent mercury monitoring activities:** **Japan** *Mr. Motoo Kaneko, MOE* *Dr. Kohji Marumoto, NIMD* **South Korea** *Dr. Young-Hee Kim, NIER (TBC)* **Taiwan** *Director General Chu, EPAT(TBC)* *Guey-Rong Sheu, NCU*
12:20	1:45	Lunch	
1:45	2:45	**Session II (Continued):** **Atmospheric Mercury Monitoring in Asia**	**Thailand** *Dr. Hathairatana Garivait, MOE* **Vietnam** Mr. Nguyen Van Thuy, Director, Centre for Environmental Monitoring, VEA **Indonesia** *Dr. Esrom Hamonagan, MOE* *Other, TBD, MOE*
2:45	3:00	Break	
3:00	4:30	**Session III:** **Collaborating to Move Forward** **Questions and Discussion**	**Review of initial proposal for collaborative mercury monitoring in the Asia-Pacific Region** *Dr. David Gay, NADP* *Dr. Guey-Rong Sheu, National Central University* **Group Discussion** • Thoughts, reactions and input from all workshop participants (round robin) • What do you think about this vision? • What kind of data or information do you want/need from a mercury network? • What are the primary research and data needs for the region? • What do you see as the main opportunities to collaborate? • How would you envision you/your agency participate in a regional network?
7:00		*Group Dinner, Location TBD*	

Date		Day 2 Thursday, July 18, 2013	
Start	End	Topic	Speaker/Session Host
9:00	10:00	**Field trip to the U.S. EPA Clean Air Status and Trends Network (CASTNET) atmospheric monitoring station (BEL116)/NADP Mercury Deposition Network (MDN) Monitoring station –MD99, Beltsville, MD (Bus departs from Hotel)**	
10:00	11:00	**Training Session I** NADP/Mercury Deposition Network Wet Deposition Overview and Training	• Mercury wet deposition collector • Siting basics • Operation, Equipment Maintenance and QA *David Gay, NADP*
11:00	12:00	**Training Session II** NADP/Atmospheric Mercury Network Overview and Training	• Speciating Tekran Technology • Siting basics • Operation, Equipment Maintenance and QA *Mark Olson, NADP/AMNet Site Liaison*
12:00	1:30	**Trip to the NOAA Center for Weather and Climate Prediction for lunch and tour College Park, MD; host Richard Artz, Deputy Director, NOAA ARL**	
1:30	3:00	**Discussion (NOAA conference room, College Park, MD)** "How Would an Asia-Pacific Network Operate?"	Overview of monitoring proposal; review and discussion of specific points, with an objective of reaching group consensus • Goal and objectives • Governance • Budgetary, funding goals • Field operations • Laboratory analysis • Data handling, management, and distribution *Multiple* QA description, demonstration of NADP software for specifics and idea generation *Mark Olson, NADP*

3:00	3:15	Break	
3:15	5:00	**Continued discussion (NOAA conference room, College Park, MD)** **"How Would an Asia-Pacific Network Operate?"**	
7:00		**Group Dinner, Location TBD**	

Date		Day 3 Friday, July 19, 2013 U.S. EPA, Ariel Rios North, Room 5530	
Start	**End**	**Topic**	**Speaker/Session Host**
8:30	10:00	**Discussion (continued at EPA offices, Washington D.C.)** **"How Would an Asia-Pacific Network Operate?"**	Continued point by point review of the proposal, editing and updating the document based on agreement among workshop participants
10:00	10:15	Break	
10:15	12:30	**Summary**	Summary discussion and review of current document version; identify any potential gaps in the plan; brainstorm network-related research and data needs • Quality assurance activities (e.g., wet deposition sampler intercomparison site/study) • Regional atmospheric fate, transport and deposition modeling
12:30	1:30	Lunch	
1:30	2:30	**Next Steps**	Identify and review commitments and plans for advancing the network after the workshop
2:30		**Meeting Adjourned**	

Notes:

To be available at the workshop

- **Gaseous SOP/NADP-GMOS   20 copies**
- **Wet Deposition SOP/NAPD-GMOS   20 copies**
- **Wet Deposition Collector, with Glassware**
- **Tekran System**
- **NADP Guidance Document   20 copies**
- **EANet Brochures   20 copies**
- **Workshop in Beijing Flyer   20 copies**

附件 5、亞太地區汞監測夥伴研討會沈世宏署長開幕致詞

Special Remarks by Minister Stephen S. H. Shen
2013 Asia-Pacific Mercury Monitoring Partnership Workshop

Mr. Beauvais, distinguished guests, ladies and gentlemen：Good morning.

On behalf of the Taiwan EPA, I want to express my deep appreciation for the USEPA's arrangement. It is my great pleasure to make special remarks here at the opening of the 2013 Asia-Pacific Mercury Monitoring Partnership Workshop.

Do you remember what you ate for breakfast? I had some rice and canned tuna. Guess what hit me all of a sudden? I remembered the Minamata Disease – which was named after a city in Japan where serious health damage occurred in the mid-20th Century as a result of mercury pollution.

Mercury is a toxic element of increasing global concern, with methyl-mercury being the most toxic type of mercury that can cause long-term development delays in children. Consumption of fish, especially deep-sea fish, is the major channel through which people are exposed to methyl-mercury. The widespread contamination of fish by methyl-mercury, therefore, is a threat to human health on a global scale.

The socioeconomic consequences of mercury contamination and exposure of human and wildlife to methyl-mercury have prompted policies and regulations to limit mercury releases from human activities and to control its transport within and among various environmental agencies at the local, regional, and global levels.

The most recent international effort against mercury pollution is the UNEP's Minamata Convention on Mercury to prevent the emissions and releases of mercury. The text of the Minamata Convention was adopted by more than 140 nations on January 19, 2013. As many of you know, the Minamata Convention will be opened for signature by governments at a Diplomatic Conference in October in Japan.

Although consumption of fish that contain methyl-mercury is the major channel for human exposure, atmosphere deposition is the most important source of mercury to many aquatic ecosystems. For example, globally the open ocean is estimated to receive about 90% of its

total mercury input via atmospheric deposition. Atmospheric mercury is deposited back to Earth's surface through wet and dry deposition where it could be methylated biologically and accumulated via the food chain to levels harmful to human health.

As a natural element, mercury is found throughout the world. However, human activity, especially mining and coal combustion, has increased the mobilization of mercury into the environment, raising the amounts in the atmosphere, soil, fresh water, and oceans. Accordingly, scientific data indicate that atmospheric mercury concentration and deposition have increased by about a factor of three globally since pre-industrial times, resulting in the increases of methyl-mercury concentrations in fish.

Globally, Asia is a major mercury source region due to immense coal combustion, industrial emissions, and biomass burning. According to the 2013 UNEP assessment report, about 1,960 metric tonnes of mercury was emitted to the atmosphere as a direct result of human activity. The greatest proportion of anthropogenic mercury emissions comes from East and Southeast Asia, making up about 40% of the global total.

The trans-Pacific transport of mercury from the Asian continent has received much attention and concern in recent years since its mercury emission is increasing, while emissions from Europe and North America have drastically decreased. Atmospheric mercury from Asia has been observed at several background monitoring stations in its downwind regions, including Mt. Lulin and Dongsha Island in Taiwan, Cape Hedo in Japan, Jeju Island in Korea, and Mount Bachelor Observatory in western United States.

However, despite the magnitude and extent of Asian mercury emissions, very few long-term regional measurements have been made to monitor the changes in temporal and spatial distribution of atmospheric mercury concentration and deposition before and after the enforcement of the Minamata Convention.

In 2006, the Taiwan EPA established a high-elevation background monitoring station on Lulin Mountain to track the trans-boundary transport of atmospheric mercury and other pollutants, create baseline measurements so as to better understand their impacts on Taiwan. Our data clearly demonstrate the export of anthropogenic mercury from the East Asian continent and mercury associated with biomass burning from the Indochina Peninsula.

In 2012, the Taiwan EPA, USEPA and the National Atmospheric Deposition Program (NADP) collaborated on mercury speciation monitoring activities, formally adopting the atmospheric background station at Lulin Mountain as the first Asian partner in mercury monitoring to

NADP.

To complement the atmospheric measurements, the Taiwan EPA runs a nationwide mercury wet deposition monitoring network consisting of 12 sampling stations that collect rainwater for total mercury analysis. The network's objective is to develop a national database of mercury concentrations in precipitation and wet deposition fluxes.

The data are used to develop spatial and temporal trend information on wet deposition and assess mercury contributions from regional and long-range transports. Our measurements reveal that the annual wet mercury deposition flux at a remote island in northwestern Pacific Ocean is about 2.5 times the fluxes measured at sites on the Pacific coast of the USA. This shows that mercury deposition is higher in the western than the eastern Pacific.

The ability to adequately demonstrate the benefits and effectiveness of conventional actions to decrease the risk of mercury exposure to humans and wildlife will require a robust, environmental monitoring and assessment program. Such a program would not only underpin policy decisions about decreasing emissions and impacts, but also quantify the effects of emission control policies.

In response to this demand, with the support of National Central University, the USEPA and NADP, the Taiwan EPA hosted an international atmospheric mercury monitoring workshop in Taipei in September 2012, with a goal to facilitate collaboration and regional cooperation on atmospheric mercury monitoring to improve capabilities to assess the long-range transport and deposition of mercury.

In addition to mercury monitoring, the Taiwan EPA implements other policies to combat mercury pollution. First, the effluence water standards are non-detected in methyl-mercury and 0.005ppm in total mercury. Second, we placed a restriction on batteries containing mercury over 5ppm in 2006. This means only batteries with mercury concentration lower than 5ppm would be produced, exported and imported. Next, the sales of non-electronic mercury thermometers were banned in 2008. A recycling system of fluorescent lamps funds from the producer subsidize the recycling unit to reuse. The average mercury recycling rate is over 50% of the treatment utilities. We will have more policies to limit the behaviors of mercury to protect our environment.

I know many of the guests here participated in last year's mercury workshop in Taipei and are key figures who promote environmental missions in your respective countries, and we all seek solutions to trans-boundary environmental problems and develop more sustainable

technologies. Years of valuable experience in your professional fields are a great asset to this workshop.

I sincerely believe that through the wide array of topics and the sharing of experiences, this workshop will facilitate mutual learning and collaboration among countries in our region in the field of atmospheric mercury monitoring. Our work to combat global environmental degradation is becoming more challenging than ever, but with the formation of partnerships with different countries around us, I realized that we are not alone.

I am grateful for your show of concern and support through your participation in this meeting. Working together, we can truly build a pathway to a better, cleaner future. I wish the 2013 Asia-Pacific Mercury Monitoring Partnership Workshop fruitful results and every success.

Thank you!

附件 **6**、發布新聞「臺美環保署在華府舉辦汞監測會議 促進亞太地區夥伴關係」

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

臺美環保署在華府舉辦汞監測會議 促進亞太地區夥伴關係

提供單位：行政院環境保護署監資處
提供日期：2013.07.18

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　　行政院環保署與美國環保署7月17日至19日在美國華盛頓特區共同舉辦「亞太地區汞監測夥伴合作會議」，共有來自我國、美國、加拿大、日本、韓國、泰國、越南及印尼等國政府及學術研究部門20餘位代表與會。我國環保署長沈世宏及美國環保署助理署長Joel Beauvais應邀開幕致詞。

　　沈世宏開幕致詞中表示，近年來由於亞太地區經濟快速發展，人為產生的汞污染物藉由氣流長程傳輸影響空氣品質，或經由降雨進入水體、魚體，對環境影響深遠，引發各國重視大氣汞跨境傳輸的監測課題。

　　沈世宏同時強調，我國對大氣汞的監測向來積極；2007年在海拔2,862公尺的鹿林山設置連續自動監測大氣汞的儀器，由於臺灣位於亞洲氣流系統之下風處，監測數據極具代表性。透過臺美環保技術合作協助，鹿林山測站目前已分別加入全球大氣汞監測網(AMNet)及美國國家汞沉降監測網（NADP），監測技術與世界先進國家同步。環保署未來將持續推動與東南亞鄰近國家監測合作，並期望我國由環保技術輸入國轉型成為環保技術輸出國。

　　Joel Beauvais致詞時對我國環保署在大氣汞監測方面之成就表達感佩，同時對臺美環保署藉由雙邊合作協定，擴大推展亞太地區汞監測夥伴關係的多邊區域合作模式，表達肯定與支持。

　　環保署指出，這項會議以亞太地區汞監測合作為主軸，分別就大氣汞及濕沉降之汞監測技術發展、監測數據品保品管、資料解析及分享等課題廣泛討論。與會人員也將參訪美國環保署之大氣海洋署之大氣背景測站，並就未來具體之合作方式交換意見。

　　我國與會代表包括環保署環境監測及資訊處長朱雨其及中央大學大氣物理系研究員許桂榮，會中除發表我國大氣及雨水的汞監測成果外，亦介紹汞污染物對我國與亞太地區長程傳輸之特徵關係，有助於瞭解國際背景空氣品質現況及未來引進超微量監測相關技術。

附加檔案：

● 「亞太地區汞監測夥伴合作會議」開幕合影（102年7月17日，美國華府）.jpg

附件 7、與美國環保署環境資訊處研商未來環境資訊系統技術合作事宜議程及討論資料

U.S. Environmental information related topics ✓

1. BIAC 如何提供服務與輔導業務系統，合作建置相關視覺化系統(visualization application,如 Dashboard)，其後端操作機制為何：美國 BIAC 技術支援的專案有 OEI TRI Dashboards(customer--Shane Knipschild)及 QATS (Quality Assurance Technical Support)(customer-- Monica Jones & Kevin Barnes)，BIAC 與業務系統分工如何? BIAC 僅提供工具，還是要支援開資料表，建立資料模型的資訊技術? 業務系統要具備何種條件或事前準備?案子是業務系統委辦還是 BIAC 委辦? BIAC 如何支應購買軟體經費(或由業務單位分攤)?目前 BIAC 提供的工具分哪幾類(OLAP、Analysis、Report、ETL…)?

1) The mechanism of back-end operations about BIAC： How does BIAC System provide counseling services and cooperative building-related visualization system (such as Dashboard) with business systems?There are two projects supported by BIAC,such as OEI TRI Dashboards and QATS (Quality Assurance Technical Support).How do these two systems divide their own support layers? Does BIAC system only provide tools? or does it need to create tables or data model to support the dashboard? Any qualified condition needed by the operational system? Which Department is in charge of outsourcing job? How does BIAC cope with and afford software purchasing fee (or share by different governmental dept.)? What kind of tools are provided by BIAC now? (such as OLAP, Analysis, Report, ETL ...) ?

leading by minsl

Sect

• What is the role of BAIC with USEPA ?

2) 美國環保署建立資料標準(Data Standards) ：該機制包含註冊機制標準化及資料標準(包含資料一致名稱、定義及格式標準)，註冊機制又可分為系統程式及資料庫註冊、資料集註冊、資料(元素)註冊、環境詞彙註冊、開發元件註冊等，資料標準化對整體資料品質(Data Quality)是否有幫助?推動標準時是否有推動機制或小組?推動小組成員為何?推動步驟如何?各註冊機制最先施行的是何者(註冊機制推廣順序)?透過了解美國運作機制，應能幫助本署今年度環境資源資料庫資料標準作業及提升本署資料品質。

2. EPA establish data standards: The mechanism includes a registration mechanism and data standards (consistent with the information included names, definitions and format standards), registration mechanism can be divided into registration system programs and databases, datasets Register , data element registration, environmental vocabulary registration, development component registration, Is data standardization improve to the overall quality of the data? Is there any system or any group who will be in charge of promoting data standards? Who are these group members? What are the promotion steps? What is the first

registered   implementation? Through an understanding of the operating mechanism of the United States should be able to help this year's Environmental Resources Department database data standard operating and improving the quality of our data.

3. 建議 2014 年本署中美合作環境資訊會議與在印尼舉辦的 JAKARTA STRENGTHENING THE RIGHT TO ENVIRONMENTAL INFORMATION FOR PEOPLE AND THE ENVIRONMENT(STRIPE)會議合併辦理，參加該會議國家包括中國、日本、印尼、蒙古、菲律賓、泰國等 6 國，該會議主題希望各國遵循資訊公開法 Freedom of Information laws (FOI) 及 The Aarhus Convention 法，兩法均致力於將政府環境資訊公開社區及民眾存取(FOI laws assist in ensuring access to environmental information by people and communities)，與本署目前推廣之環境資料開放(OPEN DATA)目標一致，本署可在該會議中提供資料開放心得與作法，為統合亞洲區環境資訊會議，建議兩會議合併召開。

3. We recommends 2014 RWGEI merged with the environmental information meeting held in Indonesia JAKARTA STRENGTHENING THE RIGHT TO ENVIRONMENTAL INFORMATION FOR PEOPLE AND THE ENVIRONMENT (STRIPE) Conference, countries participating in the conference, including China, Japan, Indonesia, Mongolia, Philippines, Thailand and other six countries, the theme of the conference hope that all countries follow Information Act Freedom of Information laws (FOI) and The Aarhus Convention Act, two laws were committed to open government environmental community and the public access to information (FOI laws assist in ensuring access to environmental information by people and communities), and our current promotion of environmental data open (OPEN DATA) goals, the Department can provide information at the meeting open to ideas and practices for the integration of environmental information meetings in Asia, the proposed two Conference jointly held.

Taiwan Gov't is currently pw
'Open Data'
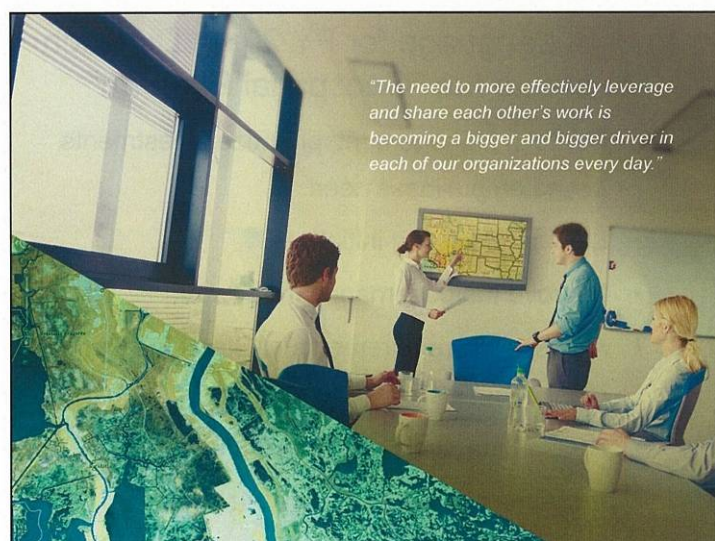
Budget Language for FY 2011, Direction to create the "Geospatial Platform"

- Portfolio Management, prioritize investments based on business need
- Leverage existing initiatives
- Improve the governance framework
- Address the requirements of State, local and tribal agencies
- Reuse data, tools and architecture
- **Increase access to geospatial data**

2

Conceptual Model

Geospatial Platform V1
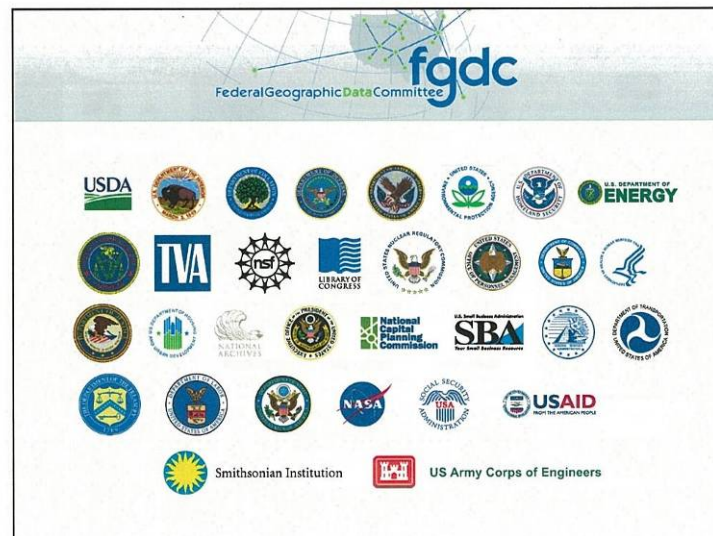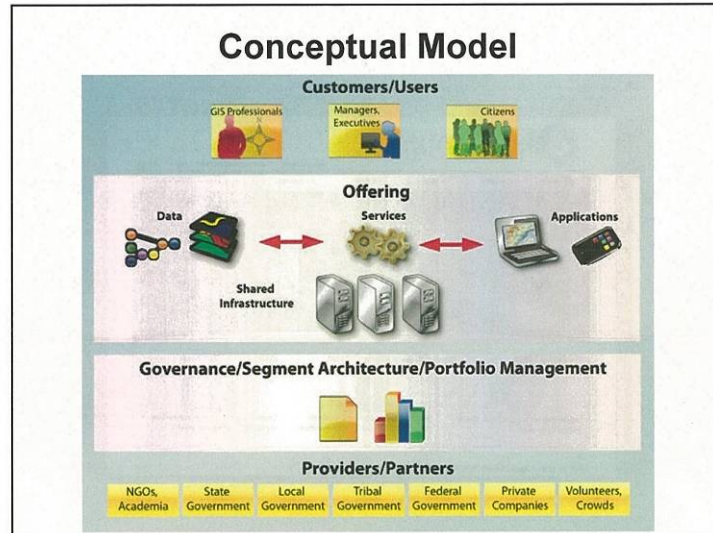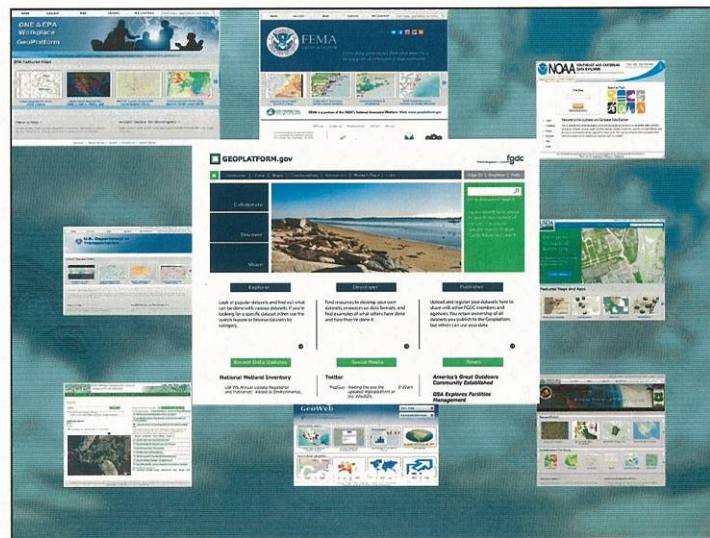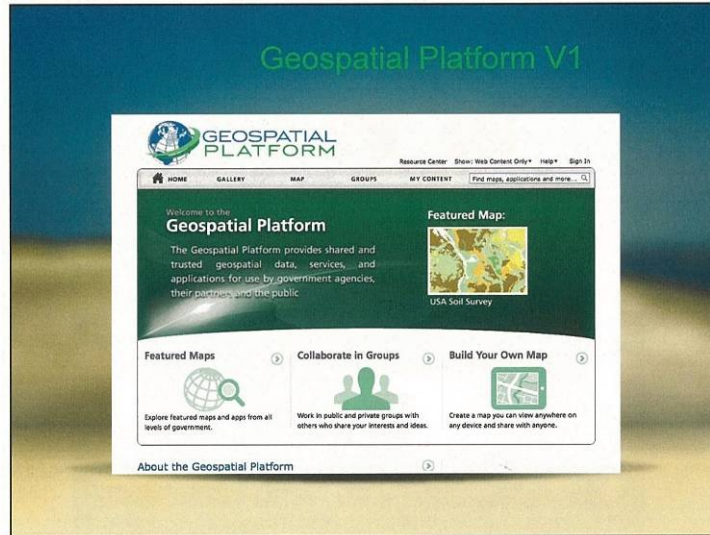
EPA GeoPlatform Effort

- Over 800 registered EPA users for epa.maps.arcgis.com
- Shared internal geospatial hosting environment
- Business Line Pilots (Enforcement Targeting, Community grants, and Environmental Justice Screening, Toxic Releases, Emergency Response Viewers, and Drinking Water
- User needs interviews with thirty office completed; continuing process
- Deputy Administrator issued memo announcing availability and require use of platform for new development: Access to GeoPlatform content now provided through custom Intranet site.
- Using geoplatform to power standardized public maps embedded in EPA's public site.

9

5

Geospatial Platform V2 – The Redesign

Discovering Geospatial Assets

Partnership with Platform

8

Developer Resources

Communities
America's Great Outdoors

10

Common Challenges

- Ease of use .... is really hard
- Data are everywhere ... but publishing for secondary use can be rough on data owners
- The cloud has awesome potential ... but is really tricky to implement for governments
- "Who am I?" ... is not such an easy question for open systems to answer
- I can mash up all this data, but then what?

11

Data Standards

18 July 2013

Definition

- Data Standards
  - Documented agreements on representations, formats, and definitions of common data
  - Improve the quality and share-ability of environmental data
    - Increasing data compatibility
    - Improving consistency and efficiency of data collection
    - Promoting reduction of data redundancy

Examples

- ## Representation of Date and Time
  - What is the date: 01/09/10?
    - January 09, 2010?
    - September 10, 2001?
    - October 9, 2001?
    - The Exchange Network standard is YYYY/MM/DD
- ## How do you exchange data about a point of contact, e.g., Robert Smith?
  - Smith: Last name? Surname? Family name?
  - Robert: First name? Forename? Given name?
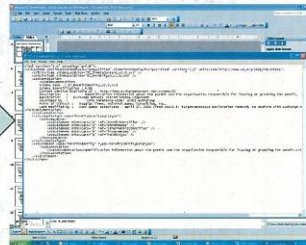 - The Exchange Network standard is Last Name and First Name (XML tags: Lastname, Firstname)

08 May 2013   3

Shared Schema Components

- ## Data Standards XML tags incorporated into Shared Schema Components
  - Shared Schema Components incorporated into data flow schema

Name	Definition	XML Tag
1.1 Permit Identifier	The alphanumeric identifier assigned to the permit	PermitIdentifier
1.2 Permit Name	The name assigned to the permit by a permitting/grangting organization to identify a permit or permit application	PermitName

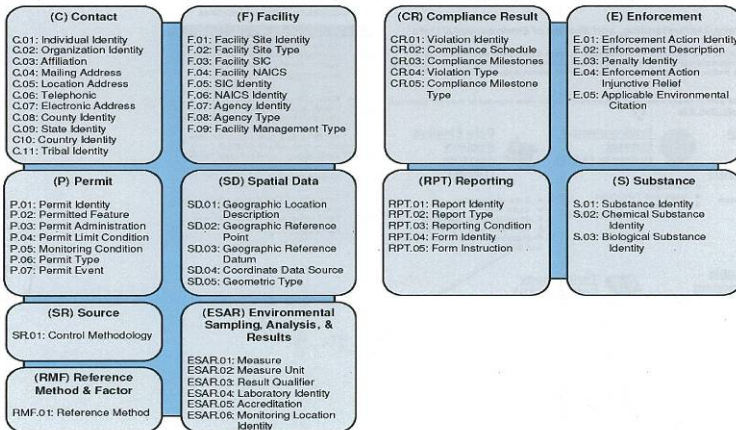08 May 2013   4

Shared Schema Components

modules Ild.

Shared Schema Components

(C) Contact	(F) Facility	(CR) Compliance Result	(E) Enforcement
C.01: Individual Identity C.02: Organization Identity C.03: Affiliation C.04: Mailing Address C.05: Location Address C.06: Telephonic C.07: Electronic Address C.08: County Identity C.09: State Identity C10: Country Identity C.11: Tribal Identity	F.01: Facility Site Identity F.02: Facility Site Type F.03: Facility SIC F.04: Facility NAICS F.05: SIC Identity F.06: NAICS Identity F.07: Agency Identity F.08: Agency Type F.09: Facility Management Type	CR.01: Violation Identity CR.02: Compliance Schedule CR.03: Compliance Milestones CR.04: Violation Type CR.05: Compliance Milestone Type	E.01: Enforcement Action Identity E.02: Enforcement Description E.03: Penalty Identity E.04: Enforcement Action Injunctive Relief E.05: Applicable Environmental Citation

(P) Permit	(SD) Spatial Data	(RPT) Reporting	(S) Substance
P.01: Permit Identity P.02: Permitted Feature P.03: Permit Administration P.04: Permit Limit Condition P.05: Monitoring Condition P.06: Permit Type P.07: Permit Event	SD.01: Geographic Location Description SD.02: Geographic Reference Point SD.03: Geographic Reference Datum SD.04: Coordinate Data Source SD.05: Geometric Type	RPT.01: Report Identity RPT.02: Report Type RPT.03: Reporting Condition RPT.04: Form Identity RPT.05: Form Instruction	S.01: Substance Identity S.02: Chemical Substance Identity S.03: Biological Substance Identity

(SR) Source	(ESAR) Environmental Sampling, Analysis, & Results
SR.01: Control Methodology	ESAR.01: Measure ESAR.02: Measure Unit ESAR.03: Result Qualifier ESAR.04: Laboratory Identity ESAR.05: Accreditation ESAR.06: Monitoring Location Identity

(RMF) Reference Method & Factor	
RMF.01: Reference Method	

08 May 2013

5

- data set
- Systems
- data.gov

https://ofmext.epa.gov/sor_extranet/registry/substreg/managesubstance/managesubstance/manage.do?details=displayDetails

File Edit View Favorites Tools Help

Favorites   Suggested Sites

Substance Details

U.S. ENVIRONMENTAL PROTECTION AGENCY
SUBSTANCE REGISTRY SERVICES

Logout
Frequent Questions/Help
Link to Data Standards

SoR Home » Substance Registry Services Home » Manage Substance » Manage Substance

| Home | Search & Retrieve | Manage Substance | Automated Services | Outreach & Education | Training | Administration |

Manage Substance | Manage List | Request New Substance | Request New List | Inbox

Substance Details - p,p'-DDT

Back to Substance Search Results

Export Substance Details (PDF)
Delete Substance Permanently

Core Metadata

Substance Type	Chemical Substance
EPA Registry Name	p,p'-DDT
EPA Registry Name List	Chemical Identification
Systematic Name	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
Systematic Name List	Chemical Abstracts Index Name
Preferred Acronym	DDT
CAS Number	50-29-3
EPA Identification Number	
Molecular Formula	C14H9Cl5
Molecular Weight	354.49
Definition	
Comment/Description	
Classifications	

Request Changes to Substance Metadata
Internal Tracking Number: 1107
Substance Status: Approved

Associated Identifiers
This section provides other identifiers associated with this substance, including former CAS numbers, incorrectly used CAS numbers, and retired EPA Identifiers.

Former CAS Number(s)	1081843-15-3

Structure

Structure Notation Type	Notation
SMILES	c1(ccc(cc1)Cl)C(c1ccc(cc1)Cl)C(Cl)(Cl)Cl

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https://ofmext.epa.gov/sor_extranet/registry/substreg/managesubstance/managesubstance/manage.do?details=displayDetails

File Edit View Favorites Tools Help

Favorites   Suggested Sites

Substance Details

Below are the EPA applications/systems, statutes/regulations, or other sources that track or regulate this substance. This table shows how each list refers to the substance. To view more metadata about the specific Synonym, click on the Synonym. If you are the steward of that Synonym you will also be able to edit it. If you do not see your substance list name, click on the "Add Substance to List" button below.

Statutes/Regulations

Statutes/Regulations	Synonym	Synonym Quality	Effective Date	End Date
SARA 110	DDT, p,p'-	Valid	04/17/1987	
CWA Priority	4,4-DDT	Valid	11/19/1982	
CWA 304B	4,4-DDT	Valid		
TSCA SA SNUR	Dichlorodiphenyltrichloroethane	Valid	01/14/1994	
TSCA SA SNUR	DDT	Valid	01/14/1994	
CERCLA	4,4' DDT	Valid		
RCRA U Waste	DDT	Valid	11/25/1980	
CERCLA	DDT	Valid		
RCRA Appendix VIII	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	Valid		
SARA 110	4,4'-DDT	Valid	04/17/1987	
CWA 304B	DDT	Valid		
RCRA Appendix VIII	DDT	Valid		
TTO	4,4'-DDT	Valid		
CWA 311	DDT	Valid	03/13/1978	
RCRA U Waste	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	Valid	11/25/1980	
CWA 311	p,p'-DDT	Valid	03/13/1978	
TSCA Inv	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	Valid		
CERCLA	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	Valid		
TSCA 12(b) Export	DDT	Valid		

EPA Applications/Systems

EPA Applications/Systems	Synonym	Synonym Quality	Effective Date	End Date
CERCLIS3	para,para'-DDT	Valid		
TSCATS	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	Valid		
CERCLIS3	p,p'-DDT	Valid		

EPA

Business Intelligence & Data Integration at the EPA

Timothy Hinds, Thom Shurtleff, & Michelle Johnson

Office of Environmental Information

Environmental Protection Agency

EPA Agenda

- Introductions
- Business Intelligence Across EPA
- ✓ What is the BIAC?
- What BI Products & Services Are Available?
- BIAC Shared Environments
- The BIAC Approach to Development
- ✓ What Does A Typical BI Project Look Like?
- ✓ Example Applications
- Questions

2

1

Business Intelligence Across EPA

&EPA

- Nearly all programs across EPA have a requirement for Business Intelligence to support any number of needs:
  - Environmental Data Presentation
  - Financial Management
  - Decision Support
  - Performance Management
  - Activity Monitoring
  - Forecasts and Projections
  - Geospatial Analysis
  - Scientific Analysis
  - Etc.

3

What is the BIAC?

&EPA

- The Business Intelligence & Analytics Center (BIAC) was formed nearly ten years ago to enhance the Agency's analytical & decision-making capabilities by:
  - Providing enterprise leadership and perspective
  - Facilitating the sharing and reuse of knowledge and experience
  - Achieving economies of scale for BI tools and applications
  - Supplying BI solutions, tools, and consulting
- The BIAC is a part of EPA's Office of Environmental Information's Office of Technology Operations and Planning (OEI/OTOP)

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♻EPA What Services Are Available?

- The BIAC offers a wide range of services:
  - Hosting & Infrastructure Operations
  - Software Provisioning
  - Consulting
  - Training
  - Application Development Support
  - Application Administration
  - Application Help Desk Support ✓

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♻EPA What BI Products Are Available?

- The BIAC offers various BI products and shared hosting for:
  - BusinessObjects XI
  - Oracle Business Intelligence Enterprise Edition (OBIEE)
  - Informatica PowerCenter
  - SAS

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BIAC Shared Environments

♻EPA

- The BIAC maintains centrally shared environments for BusinessObjects (BO), Oracle Business Intelligence (OBI), and Informatica PowerCenter
  - Leverages shared resources to save costs
  - Administered in accordance with industry best practices & standards
  - Consists of development, staging, and production servers with public access capability (for BO & OBI)
  - LDAP & SSO-enabled (for BO & OBI)
    - Lightweight Directory Access Protocol
    - Single Sign-On

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The BIAC Approach to Development

♻EPA

- An approach to development that emphasizes collaboration, iteration, and adaptation
- Alignment of development with a customer's needs, goals, and budget
- Rapid adaptation to evolving requirements
- Rapid delivery of high-quality solutions
- Working solutions delivered within days or weeks rather than months or years
- Frequent collaboration between developers and business analysts

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A Typical BI Project

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- Informatica PowerCenter
  - Extract, Transform, and Load (ETL) disparate data into a target database.
- Oracle Application Express
  - Web-based data entry tool that allows users to manage data directly in the database.
- Oracle Business Intelligence
  - Web-based dashboard, query, and reporting tool that provides end-users with direct access to their data source.

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What Does A Typical BI Project Look Like?

⊕EPA

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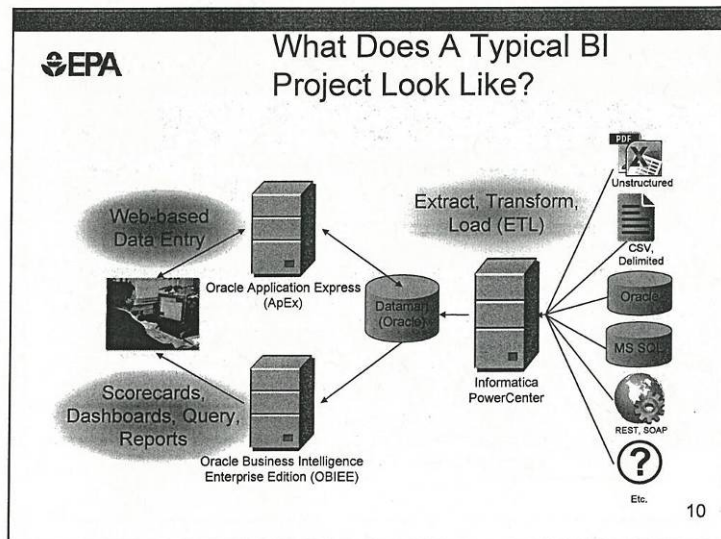
Example Application

- Cleanups in My Community (CIMC)
  - Public facing, integrated geospatial BI application
  - Informatica ETL integrates data from existing sources
  - ESRI ArcGIS Server serves up map data
  - Oracle Application Express and Oracle Business Intelligence integrated front-end for searching and reporting

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Cleanups in My Community

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Example Application

⊕EPA

- InfraView Data Warehouse
  - Internal facing, IT operations monitoring dashboard
  - Informatica ETL integrates data from IT operations system
  - Oracle-based data warehouse takes burden of long-term data storage off of operational database
  - Oracle Business Intelligence for analysis and reporting on operations

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InfraView Data Warehouse

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⊕EPA   Questions

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⊕EPA
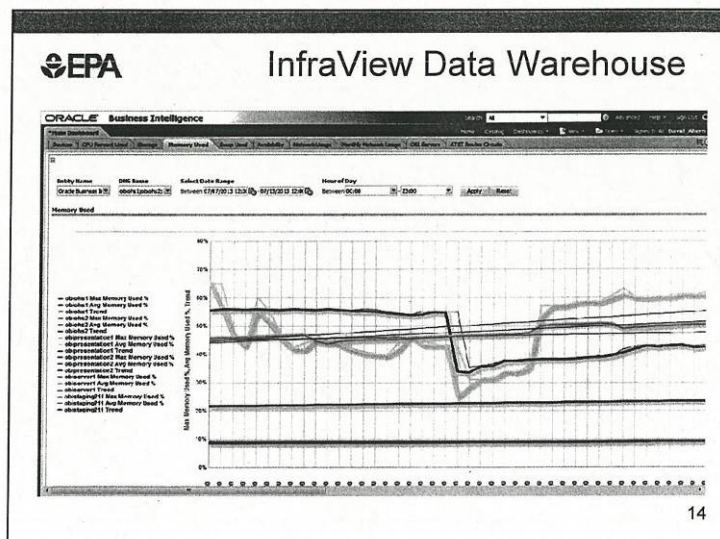
Thank you very much for your time!

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♻EPA   What is BI?

- Business Intelligence (BI) is getting the right data to the right person in the right format at the right time.
- BI is a broad category of applications & technologies that:
  - Gather,
  - Store,
  - Analyze,
  - and provide Access to data
- BI applications enable and equip decision-makers, analysts, and other information workers

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♻EPA   What is BI?

- Query and Reporting
  - Reporting
  - Scorecards and dashboards
  - Alerts
  - Collaboration
  - Ad hoc query

- Analytics and Modeling
  - Statistical analysis
  - Data modeling
  - Data mining
  - Advanced visualization

- OLAP (Online Analytical Processing)
  - Multi-dimensional analysis
  - Integrated drill-down & drill-through
- ETL
  - Data integration & cleansing
  - Interoperability
  - Integration
- Repositories, Warehouses
  - Data warehouse and data mart construction
  - Metadata repositories

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⊕EPA BIAC Key Personnel & Roles

- Key Personnel
  - Michelle Johnson (EPA) – BIAC Service Manager
  - Timothy Hinds (EPA) – BIAC Platform Manager
  - Ron Lee (SRA) – BIAC Program Manager
  - Dave Ahern (SRA) – BIAC Technical Lead

- BIAC Key Roles
  - Project Managers & Analysts
  - Application Administrators (OBI, Informatica, & BusinessObjects)
  - Developers (ETL, OBI, Apex, etc...)

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附件 8、出國期間相關照片

圖 1、本署沈世宏署長、美國環保署助理署長 Joel Beauvais、各國與會
　　來賓合照
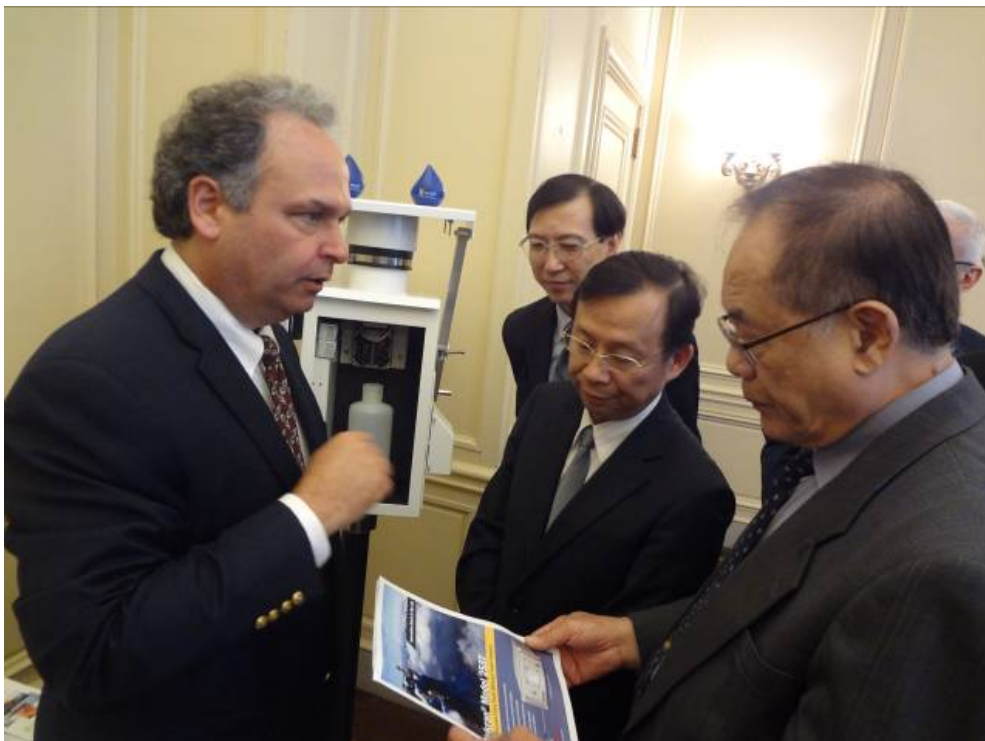

圖 2、汞監測國際合作研討會開會情形

圖 3、沈署長進行汞監測儀器致贈見證致詞

圖 4、沈世宏署長旁聽汞監測儀器操作解說