



# DIOXIN REMEDIATION AT DANANG AIRPORT AND BIEN HOA AIRBASE AREA

At the request of the Government of Vietnam (GVN), the U.S. Government agreed to complete dioxin remediation, or cleanup, of the Danang Airport and Bien Hoa Airbase area due to high dioxin concentrations in soil and sediment remaining from the U.S.-Vietnam War. After completing environmental assessments of these sites that estimated the extent of dioxin contamination, USAID and the Vietnamese Ministry of National Defense (MND) launched joint efforts to clean up the dioxin contamination and reduce the risk of dioxin exposure to the surrounding community, while developing Vietnamese capacity for environmental assessment and remediation.

## DANANG AIRPORT SUCCESS

Starting in 2012, the \$110 million Danang Airport Remediation Project used both thermal treatment and containment remediation approaches. The thermal treatment strategy involved three major steps: building an enclosed, above ground treatment structure; excavating and placing dioxin-contaminated soil and sediment into the structure; and heating the contaminated soil and sediment to a high temperature (approximately 335°C) to destroy the dioxin. Following two rounds of treatment, both USAID and MND scientists tested approximately 90,000 cubic meters of treated soil and sediment to ensure it met the approved GVN treatment goal. The treated material was then cooled, removed from the treatment structure, and used as fill material in the on-going Danang Airport expansion. In addition to thermal treatment, USAID and MND safely isolated approximately 50,000 cubic meters of low concentration, dioxin-contaminated sediments in a geomembrane-lined, and soil-capped landfill on airport land. USAID, MND, and the Vietnamese Ministry of Natural Resources and Environment agreed that containing these sediments was the appropriate means for preventing human health and environment impact.

In June 2017, USAID and MND confirmed successful thermal treatment of dioxin contaminated material. After site demobilization was complete, on November 7, 2018, U.S. Ambassador to Vietnam Daniel Kritenbrink and MND Vice Minister Nguyen Chi Vinh announced the successful completion of the project and formally handed over the final portion of 75 acres of remediated land to be used for an expansion of Danang International Airport.

## BIEN HOA AIRBASE CHALLENGE

Working in partnership with the GVN, in 2016, USAID completed an assessment of dioxin contamination at Bien Hoa Airbase, the primary Agent Orange storage and handling site during the U.S.-Vietnam War. Apart from determining the nature and extent of dioxin contamination, the assessment also developed and evaluated potential remediation alternatives, including both containment and treatment options, to reduce the risk of dioxin exposure on and around the Airbase. The assessment identified almost 500,000 cubic meters of dioxin contaminated soil and sediment in need of remediation – almost four times the volume in Danang. USAID signed agreements with MND in early 2018 for an initial 5-year, \$183 million Dioxin Remediation at Bien Hoa Airbase Area Project to remediate high-risk areas using treatment and isolation methods similar to those used at Danang Airport. USAID estimates overall remediation efforts will be completed over a ten-year period.

Following USAID and MND project preparation efforts, USAID kicked off Project master planning in September 2019 with Vietnamese government partners. USAID anticipates that initial remediation activities will begin in 2020.

*In the photo: The thermal treatment structure at Danang Airport – the size of a two-story tall, American football field. (TetraTech, Inc for USAID)*