

Additional Site Investigations

The following sections discuss the site history, summary of previous investigations, and future activities of the additional sites that have not been assigned IRP or MMRP site designations but are being investigated following the CERCLA/RCRA process (**Figure 2-9**).

9.1 Off-Base Surface Danger Zones

Four historical off-Base surface danger zones (SDZs) were identified based on historical range maps and documents reviewed by the Base. The former SDZs, Rocket Range Number 1 (ASR #2.33), Direct Fire Artillery Range (G-7) (ASR #2.61), G-6 Artillery Range (ASR #2.62), and Impact Area N-1 (ASR #2.207), including Bomb Target-3 and Bomb Target-5 were of various configurations from the 1940s to 2007. SDZs are safety buffers and not impact areas. The SDZs are adjacent to the southeastern boundary of MCIEAST-MCB CAMLEJ (**Figure 2-9**), and encompass approximately 1,632 acres encroaching on off-Base property consisting of private, state-administered, and state-owned parcels.

A PA/SI was initiated in 2009 to identify potential historical activities that may have impacted environmental media from MEC and/or MC, assess geophysical anomalies that represent the potential presence and density of MEC, and evaluate potential risks to human health or the environment relating to historical range activities (CH2M HILL, 2011). Community notification and involvement activities included contacting the land owners regarding the SDZs and for access approval, issuing a fact sheet, and holding a public meeting. Field activities included an aerial geophysical survey; DGM on dry land areas; soil, groundwater, sediment, and surface water/pore water sampling; and explosives residues and metals analysis. The results of the risk screenings indicate that there are no unacceptable risks to either human or ecological receptors due to site media. More than 5,000 anomalies were identified based on the geophysical surveys. An intrusive investigation was conducted on the 200 acres of Bear Island. One MEC item (aircraft flare) was found on the ground surface and several munitions-related items were found during the intrusive anomaly investigation on Bear Island.

An ESI was conducted in FY 2013 to further investigate the nature of geophysical anomalies in areas outside of Bear Island (CH2M HILL, 2014). MEC items were only found within the southwestern portion of the site, near the former Browns Island target area. Only MPPEH or cultural debris were found within the remaining areas of the off-Base SDZs. The probability of contact with MEC is low, primarily because the MEC items found were located within areas that were difficult to access due to marshy conditions.

The ESI recommended the following:

- Amend the ESS and reduce the current size of the off-Base SDZs to include only the southwestern portion of the site where MEC was found, near the former Browns Island target area.
- Prepare an EE/CA to evaluate future actions that may be used to mitigate potential munitions in the reduced area. The EE/CA would evaluate the relative effectiveness, ease of implementation, and cost of each alternative.

Based on the recommendations of the ESI, an EE/CA will be completed in FY 2015.

9.2 Base Boundary Survey

A Base boundary survey was initiated in 2009 to identify current and historical activities at the properties adjacent to MCIEAST-MCB CAMLEJ that may have resulted in environmental impacts to the Base and to evaluate potential on-Base impacts to soil and groundwater in the vicinity of identified off-Base areas of potential concern (AOPCs). After conducting a public database search and field reconnaissance, 12 AOPCs were identified. Environmental sampling was conducted at the AOPCs to evaluate the presence or absence of soil and/or groundwater contamination onto MCIEAST-MCB CAMLEJ. Based on the results, potential on-Base impacts to groundwater were identified at three of the AOPC (9, 10, and 11) (**Figure 2-9**). The *Base Boundary Report for Potential Off-Base*

Contamination Encroachment, Marine Corps Base Camp Lejeune (CH2M HILL, 2010) documents the results of the records review and field investigation. In 2010, the Base notified USEPA and NCDENR of the results. Additional delineation sampling was conducted in 2011-2012 and was documented in the *Base Boundary Report Addendum for Potential Off-Base Contamination Encroachment* (CH2M HILL, 2012). A summary of background information and future activities is provided below for each site.

9.2.1 AOPC 9—Camp Knox Road and North Carolina Highway 24

AOPC 9 is located near the intersection of North Carolina Highway 24 and Bell Fork Road. Groundwater sampling for VOCs, SVOCs, and lead was conducted and methyl tert-butyl ethylene, a gasoline additive commonly associated with petroleum releases, was detected above the NCGWQS in deep groundwater. Potential off-Base sources include the former Chico's Tires leaking underground storage tank (LUST) site, FastFare 557 UST site, and Ronnie Henderson UST site. All of these sites are located directly across the North Carolina Highway 24/Lejeune Boulevard right-of-way, approximately 100 feet north of the Base boundary. NCDENR issued NFA for the former Chico's Tires and Lejeune Exxon/Handy Mart 52 LUST sites, and there no known releases associated with the FastFare 557 or Ronnie Henderson UST sites. Due to MILCON activities, several AOPC 9 groundwater monitoring wells were abandoned or destroyed, two of which were reinstalled in FY 2015. LTM was conducted in February and March 2015 and the report will be submitted in FY 2015.

9.2.2 AOPC 10—Tarawa Boulevard and North Carolina Highway 24

AOPC 10 is located at the intersection of North Carolina Highway 24 and Tarawa Boulevard. Groundwater sampling for VOCs, SVOCs, and lead was conducted and petroleum-related compounds and CVOCs were identified in shallow and deep groundwater. Potential off-Base sources include petroleum contamination associated with the Silance Service Station LUST release and an unknown source of CVOCs. The Silance Service Station is classified as a low risk site according to the NCDENR UST Section. There are also active gasoline stations and former dry cleaning facilities located on the northern side of North Carolina Highway 24. LTM was conducted in January 2014 and analytical results indicated that COC concentrations are stable or decreasing. The report, recommending future periodic groundwater monitoring, was finalized in FY 2015 (CH2M HILL, 2014).

9.2.3 AOPC 11—Former Dogwood Variety Store

AOPC 11 is located off of Highway 172 in Hubert, North Carolina. Groundwater sampling for VOCs, SVOCs, and lead was conducted, and petroleum-related compounds have been identified in groundwater. The potential off-Base source is a petroleum release associated with the former Dogwood Variety Store LUST site that has been issued NFA by NCDENR. LTM was conducted in January 2014 and analytical results indicated that petroleum hydrocarbon concentrations are below the NCGWQS and that VOCs were not detected. The report, recommending future periodic groundwater monitoring, was finalized in FY 2015 (CH2M HILL, 2014).

9.2.4 SWMU 350—Former ASTs STT-61 through STT-66

The former AST facility, which consisted of Tanks STT-61 through STT-66, is located approximately 400 feet east of Iwo Jima Boulevard, a former entrance to the Tarawa Terrace housing development of MCIEAST-MCB CAMLEJ (**Figure 2-9**). The six ASTs (each with approximately 30,000-gallon capacity) at the facility were installed in 1942 and used for liquid propane storage until 1984. Rail cars would deliver and off-load liquid propane to the ASTs and the propane would subsequently be transferred from the tanks to delivery tanker trucks for service to MCIEAST-MCB CAMLEJ. In 1984, the AST piping system was modified and the facility was changed to waste oil storage. The six ASTs were removed in 1993, and the associated subsurface fuel lines for the tank system were left in-place.

Starting in 1990, environmental investigations conducted in the vicinity of the ASTs reported chlorinated and petroleum compounds in residual product collected from Tank STT-66, as well as in soil samples. Petroleum hydrocarbons and CVOCs were identified in groundwater located south and southwest of the SWMU. An IM soil removal was completed in 2006, consisting of the removal of fuel lines and impacted soils associated with the former AST system. Approximately 200 tons of soil were removed from the SWMU 350 trenches and disposed of as a non-hazardous waste material. In 2007, a CSI was conducted to further evaluate potentially impacted soil and groundwater at SWMU 350. Only arsenic and mercury were detected in soil at concentrations exceeding screening levels. In groundwater, benzene and naphthalene were detected at concentrations exceeding the

NCGWQS. In July 2007, groundwater sampling was conducted around Building TT-84, located downgradient from the site and there were no detections above the NCGWQS.

An RFI was initiated in 2009 to identify a potential source area for VOCs and to define the extent of groundwater impacts and was completed in 2012 (AGVIQ/CH2M HILL, 2012). The analytical data indicate the presence of two separate groundwater plumes posing potential future risks to human health if groundwater were used as a potable water supply. One plume, presumed to originate from an off-Base gasoline release, contained concentrations of BTEX, 1,2-dichloroethane, and naphthalene that exceeded the NCGWQS. The second plume contained concentrations of naphthalene that exceeded the NCGWQS. An investigation upgradient and off-Base was recommended to evaluate the nature of the AOC plume source area. The off-Base UST sites north of North Carolina Highway 24 have been referred to the NCDENR UST Section for possible future investigation. The site at 2003 Lejeune Boulevard (Former John's Mobil Service Gas Station) was accepted into the NCDENR UST State Lead Program in October 2011 as Incident Number 32724.

The IM concluded in May 2013 with a second round of injections and the biosparging treatability study and a sitewide groundwater sampling event were completed in November 2013. Based on the results, a CMS was initiated in FY 2015 to evaluate RAs. An expanded biosparging treatability study is being conducted in FY 2015 to assess the effectiveness of biosparging in a deeper aquifer than was assessed during the initial biosparging treatability study. Based on the results, the CMS will be updated in FY 2016.