FINAL PLAN OF REMEDIAL ACTION FOR THE REICHHOLD CHEMICAL SITE CHESWOLD, DELAWARE

August 1999

DNREC Project DE-245

Prepared by:
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Division of Air and Waste Management
Site Investigation and Restoration Branch

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I. INTRODUCTION

In late 1997, through mid 1998, CH2M Hill, the environmental consultant for Reichhold Chemicals, Inc., performed a Remedial Investigation/Feasibility Study ("RI/FS") of the Reichhold Chemical, Cheswold facility ("Site" or "Facility"), under the direction of the Hazardous Substance Cleanup Act. The RI/FS was conducted in accordance with the Delaware Regulations Governing Hazardous Substance Cleanup ("Regulations"). The RI included sampling of surface soil, subsurface soil, sediments, surface water and groundwater at various locations throughout and adjacent to the facility. The RI fieldwork was completed 1998, and the report was finalized in February 1999. The FS was completed in May 1999.

II PURPOSE

This Final Plan of Remedial Action ("Final Plan") is based on the RI/FS completed by Reichhold Chemical. The Final Plan is issued under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91, ("HSCA") and the Regulations. This Final Plan presents the Department's assessment of the human health and environmental risk posed by the impacted areas of concern.

The Department provided public notice and opportunity to comment on the Proposed Plan in accordance with HSCA and Section 12 of the Regulations. At the conclusion of the comment period, the Department, after review and consideration of any comments received issues a Final Plan of Remedial Action ("Final Plan") which will designate the selected procedures and stipulations concerning current and future activities. The Proposed Plan, the comments received from the public, the Department's responses to the comments, constitute the Remedial Decision Record.

The contents of this Final Plan include a description of the Site, the analytical results of the RI, and the selected remedy as described in the Feasibility Study (FS).

Site Description and History

The Reichhold Chemical, Inc., Cheswold facility comprises nearly 110 acres situated between Cheswold and Dover, Delaware, with approximately 30 acres developed and fenced. The Site lies 0.5 miles west of U.S. Rt. 13 and borders County Road 153 at the Hughes Crossing intersection. The Site is bound to the north by County Road 153, to the west by railroad tracks and Fork Branch. To the east is an open field and along the southern and southwestern boundaries lie a series of drainage ditches and marshes (from the RI/FS report).

The Facility presently produces styrene butadiene and polyvinyl acetate emulsion for use in the textile, adhesive, paint and paper industries, which have been in production at this facility since 1957.

Sampling of the production wells occurred several times during the 1980's and a Preliminary Assessment ("PA") of the Site was conducted by DNREC in 1990. Based upon the recommendations of the PA, a Site Inspection was conducted by the U.S. EPA and DNREC in 1991, which sampled groundwater, surface water, sediments and soils at the Facility. The Site was subsequently deferred to the State, and a Facility Evaluation ("FE") was performed in 1996

in which additional sampling was conducted at the Site. The FE concluded that further action was warranted and recommended a RI/FS.

III INVESTIGATION RESULTS

On-site soils, surface water, groundwater and sediments, and off-site surface water and sediments were sampled as part of the RI. In addition, aquifer tests, pump tests and a potentiometric water level study were conducted as part of a hydrogeologic investigation. All samples were analyzed at Quality Analytical Laboratories in Montgomery, Alabama in accordance with DNREC Standard Operating Procedures for Chemical Analytical Programs procedures and methods.

The RI identified low concentrations of formaldehyde, ethylbenzene and benzene in shallow, Columbia groundwater, and formaldehyde in deeper groundwater, but all at concentrations below drinking water standards. On-site soils contained toluene, formaldehyde, ethylbenzene, xylenes and phenolic compounds below restricted-use remediation standards, all of which were concentrated in the southwestern portion of the plant. Surface water and sediments contained varying concentrations of both organic and inorganic contaminants. Human Health and Ecological Risk Assessments, performed as part of the RI, concluded that arsenic and mercury in the drainage ditch and wetlands sediments posed potential threats and warranted further action. Concentrations of zinc and PCB's in on-site drainage ditches also warranted further action from a perspective of ecological risk.

According to HSCA regulation 8.4(1) Remedial Action Objectives ("RAO") must be established for all Plans of Remedial Action. The remedial action is evaluated utilizing both the Qualitative and Quantitative Objectives. The following considerations were taken into account in the development of the Qualitative and Quantitative Objectives:

- The current land use at the Site is industrial and will remain so in the future;

The Qualitative and Quantitative Objectives for this site are:

- Reduce concentrations and/or reduce exposure such that potential risks posed by the impacted media (surface and subsurface soil, groundwater, surface water and sediment) do not exceed DNREC's HSCA-established 1E-5 cancer risk or a hazard index value of one at each of the following areas of concern:

    1. Southwest Corner of the facility adjacent the Flare Stack;
    2. Marsh area adjacent the Southwest Corner of the facility;
    3. Drainage Ditches to Fork Branch;

- Prevent further degradation of affected media and the environment at each of the above areas of concern;

Several remedial alternatives were evaluated to address the RAO's. The alternatives for the three areas are as follows:

Southwest Corner:

Alternative 1: No action. No remedial actions would be taken and the area would be presumed to exist in its current state. This alternative is utilized as a baseline scenario in each of the areas of concern.

Alternative 2: Natural Attenuation and Monitoring of Soils in the Southwest Corner. Contaminated/impacted soils would remain in-place and would be monitored to assess whether natural attenuation processes (e.g. dilution, degradation) may further decrease contaminant concentrations which are already below DNREC's remediation standards.

Alternative 3: Deed Notification Applied to the Southwest Corner. Impacted soils would remain in-place and institutional controls, or deed restrictions, would be placed upon the area, which would prohibit or limit excavation into contaminated materials.

Alternative 4: Containment of Impacted Soils in the Southwest Corner. The Southwest Corner would be graded and paved so as to prevent both contact with, and rainfall infiltration into, contaminated soils.

Marsh Area

Alternative 1: No Action.

Alternative 2: Natural Attenuation, Access Restriction and Monitoring of Marsh Area. Contaminated/impacted sediments would remain in-place and a fence would be installed to deter trespassing. A monitoring system would be implemented to observe natural attenuation rates of sediment and surface water constituents.

Alternative 3: Re-route Drainage Ditch with Natural Attenuation, Access Restriction and Monitoring in Marsh Area. Similar to Alternative 2 above, this alternative would also entail re-routing of the drainage ditch that presently flows through the marsh area so as to prevent migration of marsh contaminants to Fork Branch.

Alternative 4: Re-route Drainage Ditch, Place Cover Material in Marsh Area. In addition to re-routing of the drainage ditch (as above), the impacted areas of the marsh would be covered with clean soil so as to prevent exposure and minimize future migration pathways.

Alternative 5: Phytoremediation of Sediments in Marsh Area. Phytoremediation consists of using plants to clean up impacted sediment and surface water, taking advantage of a plant's natural abilities to take up, accumulate and/or attenuate contaminants.

Alternative 6: Re-route Drainage Ditch, Remove Impacted Sediments in the Marsh Area. In addition to re-routing of the drainage ditch (as above), the impacted

areas of the marsh would be excavated and removed, for off-site disposal or treatment.

Drainage Ditch to Fork Branch

Alternative 1: No Action.

Alternative 2: Natural Attenuation and Monitoring. Similar to above, impacted sediments would remain in-place, and a monitoring system would be developed to observe natural attenuation rates of sediment and surface water impacts.

Alternative 3: Re-route Drainage Ditch, Place Cover Material in Existing Ditch. The existing ditch would be re-routed and covered with clean material to both prevent exposure and block future migration pathways.

Alternative 4: Re-route Drainage Ditch, Remove Impacted Drainage Ditch Sediments. In addition to re-routing of the drainage ditch, contaminated sediments within the existing drainage ditch would be excavated, removed, and disposed or treated off-site.

The details of each of the above remedial alternative are conveyed in the CH2M Hill FS.

IV. FINAL PLAN OF REMEDIAL ACTION

Based upon the information and results of the investigations performed at the Reichhold Chemical, Cheswold Facility, Delaware, the DNREC-SIRB recommended plan of remedial action for the three areas of concern is as follows:

Southwest Corner: Alternative 1, No Action. Contaminants identified in subsurface soils in the Southwest Corner of the Facility are already below DNREC remediation standards.

Marsh Area: Alternative 3, Re-Route Drainage Ditch with Natural Attenuation, Access Restriction and Monitoring in Marsh Area. By re-routing the drainage ditch around the marsh area, contaminants within the marsh would be prevented from migrating to the Fork Branch. Contaminants within the marsh would be monitored for natural attenuation rates and the information would be reviewed in ten years. If reduction of contaminant concentrations is deemed insufficient at that time, other alternatives will need to be considered. The installation of fencing would limit human exposure to sediment contaminants by preventing contact.

Drainage Ditch leading to the Fork Branch: Alternative 3, Re-Route Drainage Ditch, Place Cover Material in Existing Ditch. This alternative would achieve protection of human health and the environment by reducing contact with impacted sediments.

In addition, a deed restriction will be placed upon the property to limit the use of the property to industrial usage.

V. PUBLIC PARTICIPATION

The Department actively solicited public comments or suggestions on the Proposed Plan of Remedial Action and welcomed opportunities to answer questions. Copies of the Proposed Plan could have been seen at DNREC-SIRB's New Castle office and the Dover Public Library. The comment period began on August 1, 1999 and ended at the close of business (4:30pm) on August 20, 1999. No questions or comments were received.

VI. DECLARATION

This Final Plan of Remedial Action for the Reichhold Chemical site is protective of human health, welfare and the environment, and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

William W. Hill 9-8-99

William W. Hill Date
Acting Director
Division of Air and Waste Management

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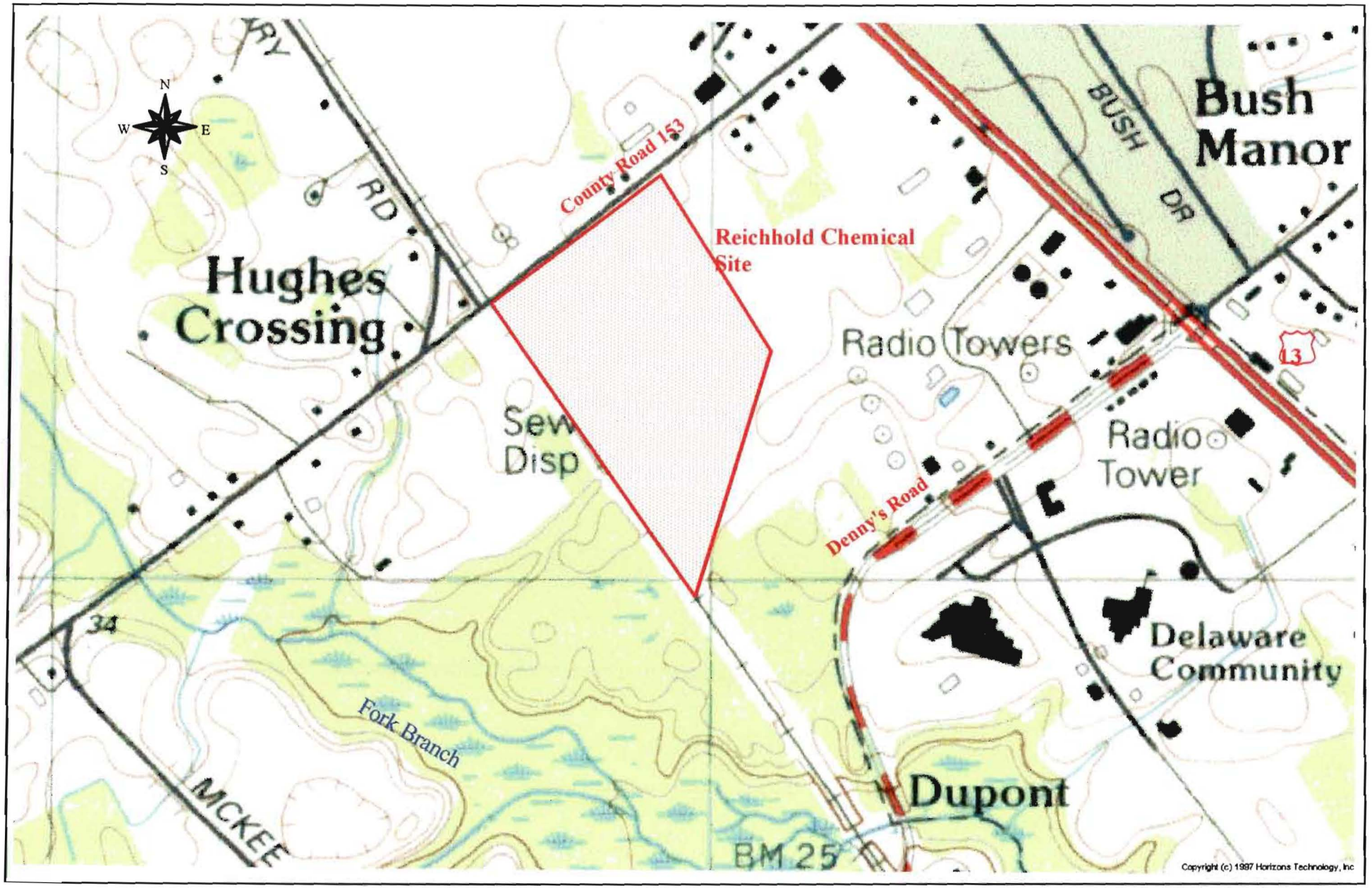

Figure 1: Reichhold Chemical Site Location

Scale 1:4,012

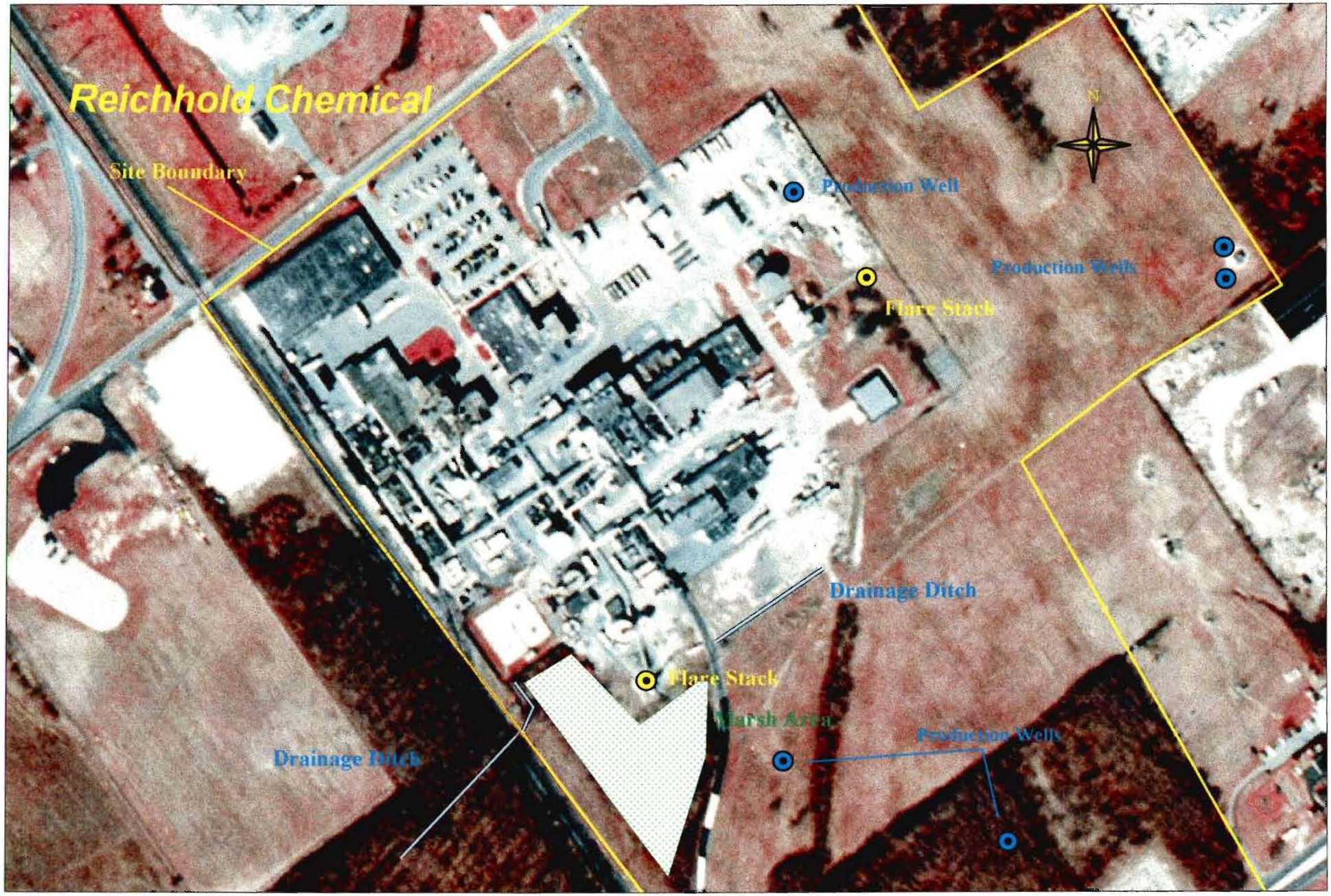

Figure 2: Reichhold Chemical Site Layout

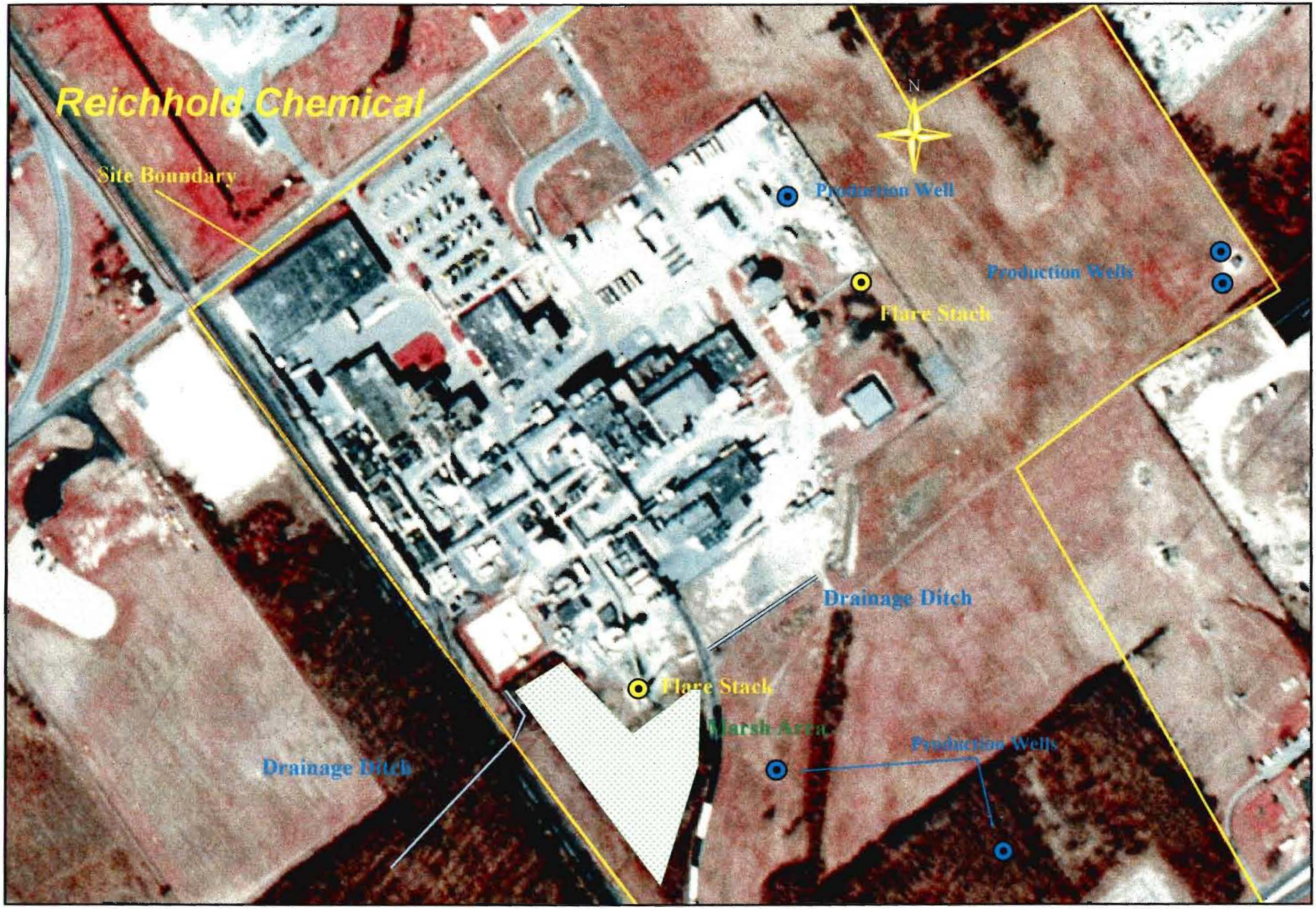

Figure 3: Remedial Investigation On-Site Sample Locations

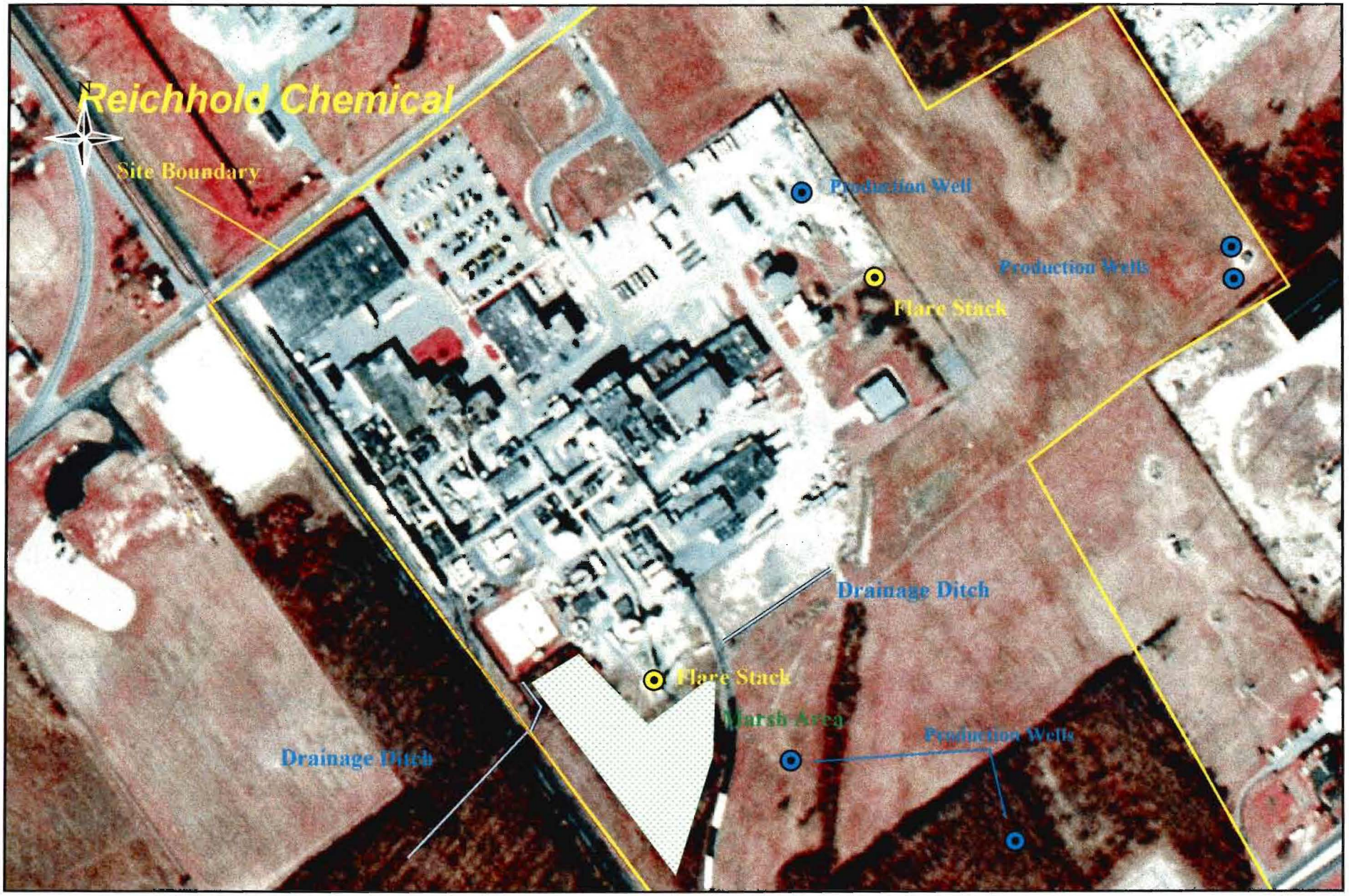

Figure 4: Remedial Investigation Off-Site Sample Locations