

SEPTEMBER – OCTOBER TECHNICAL REPORT AMERICAN CYANAMID SUPERFUND SITE

CRISIS, Inc.

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Ross Stander and I concluded that it would be useful to present an accounting of where things stand at the Bridgewater former American Cyanamid Superfund site that has been the focus of CRISIS' attention for more than two decades. While some remedial actions were taken many years ago, EPA's Record of Decision (ROD) of September 2012 set into motion a broad array of remediation actions that have progressed significantly in the past four years, but which are still not built or operational. This is about to change ...finally.

The purpose here is to update and outline, not to provide our public with a detailed description of each remediation measure in progress, and what problem or issue it is designed to mitigate.

Feel free to contact me at iwhitman@whitmanco.com for further discussion of any of the topics covered in this report.

1.0 SITE-WIDE GROUND WATER

Ground water quality is the single most complex element in the cleanup of the American Cyanamid site, as it is at many properties that have been designated as Superfund sites. It is also the element of the remediation that is furthest along in its progress. *CONSTRUCTION ON THE SITE-REMEDICATION SYSTEM WILL BEGIN NEXT YEAR; POSSIBLY EARLY IN THE YEAR.*

PURPOSE: The purpose of the site-wide ground water remediation is: a) to contain all contaminated ground water within the footprint of the site, and to prevent contaminants from being transported beyond the boundaries of the property; and b) to restore the quality of the ground water beneath the site to conform to New Jersey's Ground Water Quality Standards. There are actually two layers or strata of ground water: 1) shallow – confined to the shallow overburden layer of soil beneath the site; and 2) deep –as in the cracks and channels within the bedrock beneath the soil throughout the entire property.

Among the many important elements in remediating ground water at American Cyanamid, these are the most prominent:

- **Extraction.** Ground water will be extracted by pumping water from wells installed as extraction wells, both from the overburden soil and from the bedrock. Installation of these wells is complete; and field testing of the wells will be completed by the end of this year.

- **Containment.** Approximately 2 miles of shallow cutoff walls are being built to contain and facilitate collection of shallow ground water from within the overburden soil. Design of the barriers is near completion.
- **Conveyance.** Ground water force mains (collection pipes flowing under pressure) with pumping stations will start construction. These pipes will deliver the shallow and deep ground water to a centralized treatment plant located at the upland Area 8 on the property, also known as the “RCRA impoundment”.
- **Treatment.** Ground Water contaminants will be treated and removed by a sequence of approximately 10 separate physical, chemical and biological treatment processes, some conventional and some high-tech. A wide array of organic and inorganic chemicals will be treated, resulting in the generation of solids residues (sludge) that will be dewatered and disposed on land. Construction of the new permanent treatment facility (GWTF) will begin next year, as the design is virtually complete. It will be housed within a new building that will also have administrative offices and maintenance equipment. A construction management contractor has been selected by Pfizer for this treatment facility. *My next Technical Report, to be issued in December 2016, will provide more detail on the ground water treatment processes.* A temporary modular treatment system has been operating since 2012.
- **Operation.** Once completed, the treatment facility will be operated by NJDEP licensed treatment plant operators. An extensive shakedown and testing period will be needed before Pfizer will be permitted to put the treatment plant on line. Once operating, it will require regular effluent monitoring and testing. This system will likely be in operation for decades.
- **Injection.** Treated ground water effluent will be conveyed to bedrock injection wells that have been installed and tested. The effluent will (if the plant is operating properly) meet ground water quality standards.
- **Agreements.** The treatment facility requires a myriad of agreements and arrangements such as: agreements with PSE&G for electric service to the plant; fire water connections with New Jersey American Water Company; access agreements for pipelines to cross rail lines, etc.
- **Regulatory.** To start construction of the plant Pfizer needs an approved Remedial Action Work Plan from EPA, permit equivalents from NJDEP, water allocation permits, flood hazard permits, air quality permit equivalents, etc. Progress is being made in securing these necessary regulatory approvals.

2.0 IMPOUNDMENTS 1 & 2

Impoundments 1 & 2, located on the south side of the property a few hundred feet from the Raritan River are each about 2 acres in size containing some of the nastiest organic chemical residues of any on the entire property. The hazardous contents of these two storage areas are not only chemically diverse and resistant to treatment, but their physical properties make this corrosive material very difficult to handle. Whereas EPA’s 2012 record of Decision specified remediation concepts and programs for other areas on the site, for Impoundments 1 & 2 it specified the conduct of a Focused Feasibility Study. As a consequence the remediation of Impoundments 1 & 2 is likely 4 to 6 years behind the progress made elsewhere on the property. Key steps in the remediation of this most challenging area of the property include:

- **Bench Scale Treatability.** Largely completed in 2013, laboratory testing of the Impoundment 1 & 2 waste material led to the design and implementation of a Field Pilot Study in 2014.
- **Field Pilot Study.** In 2013-2014, three test cylinders each 7 feet in diameter were constructed in Impoundment 2 – heavily reported on by CRISIS, Inc. at the time. One test cylinder was treated by thermal treatment, a second with chemicals added for solidification and stabilization, and a third for a combination of the 2 treatment approaches. Following the generally successful pilot study, additional laboratory tests were run to further explore the feasibility of mechanical dewatering, thermally enhanced solidification/stabilization, and the compatibility of the treated wastes with landfill liner materials. The test reports have been approved by EPA.
- **Alternative Treatment Technologies.** Although there has been extensive discussion on alternative technologies between Pfizer and EPA, the difficulties inherent in the potential treatment alternatives have prevented the Focused Feasibility Study (FFS) from being completed, even though 4+ years have elapsed since the 2012 Record of Decision. There has been no formal discussion with CRISIS identifying the alternatives receiving serious consideration, although we have asked to be briefed on the alternatives that will be in the FFS.
- **Likely Treatment.** Through general discussion with EPA and Pfizer at our bi-monthly conference calls we believe that EPA will not permit the waste residues in Impoundments 1 & 2 to be contained in place, either treated or untreated. We also believe that they will not permit untreated waste to be transported off-site for treatment and/or disposal. If true, CRISIS concurs with EPA eliminating these possibilities. This leaves what we consider to be the likely alternative accepted by EPA; treatment of the contents of Impoundments 1 & 2 in place – by some combination of the treatment methods tested in the 2014 pilot study; then transport treated waste to the upland disposal Area 8 for on-site disposal in a lined landfill area.
- **Future Steps.** Once there is some concurrence on the alternative treatment possibilities, Pfizer's Focused Feasibility Study can be completed, leading to a) review by EPA's outside (of Region 2, New York) Remedy Review Board; b) advertise the plan and public comment; c) Record of Decision; d) design and e) implementation and construction. It is my guess that the earliest we are likely to see the actual remediation completed would be 2021.

3.0 IMPOUNDMENTS 3, 4 & 5

Impoundments 3, 4 & 5 are located on the western side of the property near Cuckel's Brook. These 3 lagoons were used by American Cyanamid to dispose hazardous process wastes from industrial operations, which, in general, are less toxic than those stored in Impoundments 1 & 2, but more toxic than those stored in Impoundments 13, 17 and 24. These wastes included Volatile Organics (benzene, xylenes), Semivolatiles (naphthalenes, chlorobenzenes) and metals (arsenic, chromium, mercury).

- **Remediation Approach.** EPA determined that the wastes stored in these 3 impoundments meet their definition of "principal threat wastes"; therefore the full vertical depth of the wastes in storage would be treated by in-situ solidification/stabilization (S/S), topped by an impermeable cap. The feasibility of this approach for these wastes was confirmed by laboratory testing.

- **Relocated Materials.** Field studies have been completed to identify small volumes of other wastes on site for which the S/S approach would be an appropriate remedy, and some of these wastes will be relocated to Impoundments 3, 4 & 5.
- **EPA Approvals.** A Field Sampling and Analysis Report for Impoundments 3, 4 & 5 was submitted to EPA in September, and a Preliminary Design/Investigation Report is nearing completion. Approval of the preliminary design by EPA will clear the way for the construction and implementation of the remedy for these impoundments.
- **Design.** By the end of 2016 Pfizer expects to request bids from engineering consultants to design the remediation process and cap for Impoundments 3, 4 and 5. Given that schedule, I would expect construction of the remedy to begin in late 2018 or sometime in 2019.

4.0 IMPOUNDMENTS 13, 17 & 24

Impoundments 13, 17 & 24 were the primary subjects of my Technical Reports in March – April and May – September 2015. They are located on the river-side of a flood control berm that makes them flood prone. These impoundments contain solids (sludge) from American Cyanamid’s waste treatment operations. As such they are identified by EPA as “hazardous”, but the concentrations of hazardous chemicals in these storage lagoons are lower than the concentrations found in Impoundments 1 & 2, or 3, 4 & 5. Because of the potential flood damage to these impoundments, EPA’s 2012 Record of Decision did not specify a remedial approach, and instead required Pfizer to conduct an Ecological Risk Assessment (ERA) of the 3 lagoons. Extensive sampling of the lagoons determined that the primary hazards were in the top 2 feet of soil-like material stored there.

- **Ecological Risk Assessment.** The specified Risk Assessment was conducted in 2013 and 2014, and the results were presented to CRISIS in March 2015. The Risk Assessment was conducted for terrestrial habitat (birds and animals) but not for aquatic habitat. In general, no serious threat to wildlife was found from the contents of these impoundments.
- **Remediation Approach.** Based on the Ecological Risk Assessment EPA specified that the top 2 feet of material would be removed from Impoundments 13, 17 & 24, replaced with non-contaminated material, and capped. The waste from the top two feet of these lagoons will be capped in a secure protective cover elsewhere on the property.
- **Regulatory Status.** Impoundments 13, 17 & 24 are in about the same stage with regard to EPA processes as are the more highly contaminated Impoundments 3, 4 & 5, and approval has been received to engage a design firm for the remediation, which could occur before the end of this year.
- **Design.** The design and implementation of the remedial action for Impoundments 13, 17 & 23 should be simpler and quicker than for Impoundments 3, 4 & 5, as no in-situ treatment will be conducted, only removal of the top layer of material, and capping. Construction of the remedy is likely to begin in 2018.

CRISIS has previously objected to the plan that will allow material originally disposed in these impoundments to stay in place – within a flood plain beneath the cap. We do believe that our objections resulted in the decision to remove the entire top two feet layer, not just the most highly contaminated “hot spots”.

5.0 AREAS REQUIRING SOIL REMEDIATION

There are several minor areas scattered throughout the American Cyanamid property where soil surfaces require some form of remediation. One of these is identified as the Drying Bed Area. In general, their status is similar to that of Impoundments 3, 4 & 5, and 13, 17 & 24 in that they are nearing the stage where EPA approval will enable Pfizer to engage engineering consultants to design the remediation specified by EPA. Of note with these areas:

- **Materials Acceptance Plan.** This is a regulatory process for soils that will be excavated and exported.
- **Flood Hazard Permits.** Soils which are to remain in flood prone area must be subject to NJDEP Flood Hazard Equivalent Permits. Federal remediation projects do not require state agency permits. To satisfy NJDEP, a process was developed for NJDEP to issue “permit equivalents” in lieu of actual permits.
- **Wetlands.** Areas identified as wetlands are subject to state imposed wetlands disturbance and/or protection requirements.
- **Drying Bed Areas.** There are areas of “soil” that have been identified as former waste drying beds, and were subject to investigation as such.
- **Vapors.** There are areas of soil cover where impermeable caps will be installed to protect against the emission of subsurface vapors.
- **Design.** Pfizer will be pre-qualifying design firms to prepare and complete a remediation design for each of the designated areas of soil contamination concern.

6.0 MISCELLANEOUS AREAS OF CONCERN

In an area as large and complex as the American Cyanamid site, there are bound to be some areas that just don't fit into any of the major categories of concern, including:

- **Route 287 Pond.** I am not sure of the origins of this pond, or whether remediation will be required. But in this rather dry year of 2016, this pond has been too dry to take surface water samples. Perhaps in a world of “global warming” it will just disappear!
- **Impoundment 7.** This impoundment was emptied of stored liquid, and used (temporarily) as a storage vessel for storm water generated on the property that is then transferred to the SRVSA treatment plant. It is not clear as to what the long term fate of Impoundment 7 will be.

If you have any questions or comments, please contact CRISIS' Technical Advisor by e-mail at iwhitman@whitmanco.com.

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