

#### 4.6 Post Closure Plan

Ref: 40 CFR Part 270.28  
40 CFR Part 270.14(b)(13)

The GCD facility is located approximately 1-mile northeast of Quapaw, Oklahoma in Ottawa County, between Quapaw, Oklahoma and Baxter Springs, Kansas. The facility is located north of U.S. Highway 69A. The post closure facility consists of a closed impoundment and monitoring wells on otherwise vacant agricultural land. The GCD tract of land consists of 147 acres (+/-) located in the S/2 of Section 24, Township 29 North, Range 23 East.

The post closure facility is adjacent to Umicore Optical Materials USA Inc., and Ceradyn, a 3M Company, on an approximate 620 acre parent tract of land that includes: the South one-half (S ½) of the Northwest one-quarter (NW ¼) and the South one-half (S/2) of Section 24, Township 29 North, Range 23 East; plus all of Section 25, Township 29 North, Range 23 East which lies north and west of U.S. Highway 69A, including a strip twenty feet wide on the south and east side of U.S. Highway 69A as it traverses Section 25, Township 29 North, Range 23 East.

The former Eagle Picher Industries Electro-Optic Materials (EOM) Department, which is now under separate ownership by Umicore Optical Materials USA, Inc. once utilized one non-discharging natural clay lined containment pond for waste water disposal.

The chemical operations at the former EOM included the primary and secondary refining of germanium and gallium, the chemical and metallurgical refining of germanium and gallium materials, the growth of single crystal silicon, the production of natural boron, and the production of lithium hydroxide.

The containment pond, when in operation, had a surface area of approximately seven and three-fourths acres with a maximum capacity of 10.8 million gallons. The EOM operation was identified by the U.S. Environmental Protection Agency Identification Number OKD 007158454.

The waste contained in the containment pond was primarily hydrochloric acid containing arsenic acid. The combination was neutralized to pH 7 using calcium hydroxide. On an intermittent basis, selenium, antimony, zinc, gallium, germanium, and ammonium fluoride traces may have been released to the pond. The neutralized lime slurry contained the following percentages, by weight: eight (8) to ten (10) percent calcium; fifteen (15) to twenty-five (25) percent chloride; zero (0) to five percent iron; zero (0) to ten (10) percent sodium; and zero to ten (10) percent magnesium, and the balance is water. The intermittent components include, by weight, zero (0) to 1.3 percent arsenic; zero (0) to ten (10) percent fluoride; zero (0) to one (1) percent antimony and zero (0) to one and one-half (1.5) percent selenium. Other elements may have been found in trace amounts.

The containment pond was designed and built to impound the liquor from the process plant after neutralization. The neutralized slurry was approximately 15% solids and 85% water. All wastes in the impoundment were from single discharge and were compatible, non-reactive, and non-ignitable.

At closure, all liquid wastes and sludge was solidified and subjected to the Paint Filter Liquids Test (Method 9095), the contaminated soils were stabilized in-place until the material passed the Paint Filter Test and all free liquid were eliminated, as detailed in the Waste Analysis section of the Term 2 Post Closure Permit (formerly Permit Attachment 1/Waste Analysis).

The operation is located in a sparsely developed area. Google Earth® images from 2015 depict no residences within one-half mile radius of the center of the closed impoundment and eight (8) single family residences immediately outside that radius in Section 19, Township 29 North, Range 24 East. The surrounding terrain although relatively flat, has adequate drainage to a tributary of Spring River. Figures 2 and 3 depict a 1-mile radius relative to the center of the closed impoundment.

Upon completion of closure, the facility began thirty (30) years post closure care. The post-closure plan must identify the activities that will be carried on after closure of the closed impoundment unit and the frequency of these activities, and include at least:

- (1) A description of the planned monitoring activities and frequencies at which they will be performed to comply with Subpart N (Landfills) of 40 CFR Part 264 during the post-closure care period; and
- (2) A description of the planned maintenance activities, and frequencies at which they will be performed, to ensure:
  - (i) The integrity of the cap and final cover or other containment systems in accordance with the requirements of Subpart N (Landfills) of 40 CFR Part 264; and
  - (ii) The function of the monitoring equipment in accordance with the requirements of Subpart N of 40 CFR Part 264; and
- (3) The name, address, and phone number of the person or office to contact about the hazardous waste disposal unit or facility during the post-closure care period.

### Monitoring

The closed impoundment is monitored in three ways:

1. It is secured with fencing to prevent unknowing or unauthorized entry. See Section 4.2 entitled *Security Procedures and Equipment* for detailed information. Any failure of locks, downed fences, or other security breaks shall be reported and/or repaired immediately, and the proper notations entered in the inspection record.
2. It is subject to periodic visual inspections during routine site visits. Those inspections are conducted to evaluate the condition of the final (soil and vegetative) cover, fencing and monitoring wells. See Section 4.3 entitled *Inspection Schedule* for detailed information. GCD will formally inspect the closed impoundment annually to insure the function and integrity of the final cover and to ensure security is maintained. Any discrepancies shall be immediately repaired or remedied as required. GCD will also formally inspect

visually on an annual basis for obvious seepage or evidence of toxicity such as wet spots or dead vegetation. Observations shall be recorded, dated, and signed. Corrective actions shall be immediate.

3. It is subject to groundwater monitoring to detect the possibility of post closure escape of hazardous constituents. See Section 4.9 entitled *Groundwater Protection* for detailed information, which is summarized at the end of this Section in Table 4.6.

### Maintenance

Maintenance includes activities, on an as needed basis, such as:

- Fence and gate repairs
- Removal of deep rooted woody vegetation from the final cover
- Erosion repair
- Repair or replacement of severely damaged bollards or well pads
- Keeping key access roads accessible to site vehicles

The need for maintenance will be determined during the required inspections. Most items requiring attention are such that the need will be revealed during routine site visits or well sampling. Corrective action will be taken immediately as required. Inspections will be conducted as described in Section 4.3.

The security fence, final (soil and vegetative) cover, monitoring wells, and access roads are maintained at a level necessary to preclude unknowing entry, unauthorized entry, deterioration, or other conditions that would result in the post closure release of hazardous constituents to the environment, to the extent practical.

For example, during the required sampling program, the monitoring wells will be inspected. Should collapse or other failure occur, the well will be repaired or replaced. Replacement wells will be constructed within fifty (50) feet of the failed well, or as agreed upon with the ODEQ. Repair or replacement shall be documented, notations shall be made in the facility environmental records, and shall be maintained for a minimum of three (3) years, as required.

With respect to run-on and run-off control, the site was graded (crowned) after placement of final cover to provide surface drainage. No water will be allowed to collect. The terrain is configured in such a way that run-on will be diverted around the closed impoundment. Run-off is channeled radially off the closure cap in a sheet drainage pattern to restrict erosion. Maintenance will consist of visual inspection and correction of any drainage problems noted.

### Financial Requirements for Post Closure Care

The present value of the post closure Trust Fund is \$398,437 for the remaining post closure period. The detailed post closure cost estimate may be found in Section 4.8.

Any change in the Post Closure Plan that increases the cost of post closure will result in an updated cost estimate. In addition, annually, the latest post closure cost estimate will

be adjusted by either using an inflation factor derived from the annual Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce in its *Survey of Current Business*, or by recalculating costs. If an inflation factor is used, it will be calculated by dividing the latest published annual Deflator by the Deflator for the previous year.

Term of Permit

The original post-closure permit was issued December 31, 1993; therefore, according to 40 CFR Part 264.117 post closure care must continue for 30 years after that date, or December 30, 2023. It is understood the ODEQ can extend the post closure period if necessary to protect human health and the environment. The post closure period may also be shortened. Furthermore, GCD is familiar with USEPA guidance (December 2016) provided to regulators for addressing the post closure period. GCD is applying for a full term (10 year) post closure period with the understanding the permit may be terminated before expiration when the post closure period is completed, and post closure care is no longer required.

Contact(s)

The environmental staff at GCD in Quapaw, Oklahoma will be responsible for maintaining a copy of the Post Closure Permit and Post Closure Plan during the post-closure care period. The primary contact for post closure information is:

Greg Evans – Managing Member

Mailing Address:

GCD Resources, LLC  
PO Box 67  
Quapaw, OK 74363

Physical Address:

GCD Resources, LLC  
3225 S 625 Road  
Quapaw, OK 74363

Phone:

(918) 673-2511

*GCD believes these activities comply with the intent and technical requirements of 40 CFR Part 264.118.*

**TABLE 4.6  
TERM 3 GROUNDWATER MONITORING PLAN SUMMARY  
GCD RESOURCES, LLC  
QUAPAW, OKLAHOMA**

WELLS	PROPOSED MONITORING REQUIREMENTS	
	ANALYTE(S)	FREQUENCY
<b>BG-01</b>  Background well see 4.9.2.6	As, Ba, Cd, Cl-, Co, Cr, F-, Hg, Mn, Na, Ni, Pb, Sb, Se, SO4, Zn, pH, SC  Static Water Elevation	Annual  Each sampling event
<b>RP</b>  Slurry Wall Wells see 4.9.2.8 and 4.9.2.10	As, Ba, Cd, Cl-, Co, Cr, F-, Hg, Mn, Na, Ni, Pb, Sb, Se, SO4, Zn, pH, SC  Static Water Elevation	Annual  Each sampling event
<b>RM</b>  Remedial Action Wells see 4.9.2.9	Cd, Mn, pH, SC  Static Water Elevation	Annual  Each sampling Event

**Abbreviations:**

As/Arsenic  
 Ba/Barium  
 Cd/Cadmium  
 Cl-/Chloride  
 Co/Cobalt  
 Cr/Chromium  
 F-/Fluoride  
 Hg/Mercury  
 Mn/Manganese

Na/Sodium  
 Ni/Nickel  
 Pb/Lead  
 Sb/Antimony  
 Se/Selenium  
 SO4/Sulfate  
 Zn/Zinc  
 pH/pH  
 SC/Specific Conductance