UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

PROPOSAL TO REISSUE AN EXEMPTION TO ARCELORMITTAL BURNS HARBOR, LLC FOR THE CONTINUED INJECTION OF HAZARDOUS WASTE SUBJECT TO THE LAND DISPOSAL RESTRICTIONS OF THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Action: Notice of Intent to Reissue an Exemption to ArcelorMittal Burns Harbor, LLC (ArcelorMittal) for the Injection of Certain Hazardous Wastes via four Injection Wells located at 250 West U.S. Highway 12, Burns Harbor, Indiana.

Summary: The U. S. Environmental Protection Agency, Region 5, proposes (through this notice) to reissue an exemption from the ban on disposal of hazardous wastes (land ban) through four injection wells. If the exemption is reissued, ArcelorMittal may continue to inject Resource Conservation and Recovery Act (RCRA, codified at 42 USC §§ 6901-6992k) regulated hazardous wastes, defined at Title 40 of the Code of Federal Regulations (40 CFR) Part 261 and designated by waste code K062, through waste disposal well Spent Pickle Liquor (SPL) # 1, and waste codes D010, D018, D038 through Waste Ammonia Liquor (WAL) #1 and WAL #2, and begin to inject RCRA wastes coded D010, D018, and D038 through well WAL #3.

On June 5, 2013, ArcelorMittal requested that EPA modify the exemption from the land ban published in the Federal Register on October 25, 2010. The request was based on a showing under 40 CFR § 148.20(a)(1)(i) that any fluids injected will not migrate vertically out of the injection zone or laterally to a point of discharge or interface with an underground source of drinking water (USDW) within 10,000 years. EPA has conducted a comprehensive review of the request and other materials submitted by ArcelorMittal and has determined that the request meets the requirements of 40 CFR Part 148, Subpart C.

Supplementary Information:

I. Background

A. Regulatory Requirements – Section 3004 of the RCRA prohibits the land disposal of untreated hazardous waste. RCRA specifically defines land disposal to include any placement of hazardous waste into an injection well (RCRA Section 3004(k)). Under 40 CFR § 148.20, any person seeking an exemption from that prohibition must submit a petition demonstrating that, to a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection zone for as long as the waste remains hazardous. These petitions, commonly referred to as "no-migration" petitions, must meet the regulatory standards promulgated in 40 CFR Part

148 Subpart C.

The demonstration of no-migration requires a showing that either 1) injected fluids will not migrate upwards out of the injection zone or laterally to a point of contact with a USDW, or 2) before such migration occurs, the injected fluids will no longer be hazardous. The Underground Injection Control (UIC) regulations specify the time frame for which these predictions must be demonstrated as 10,000 years.

B. Facility Information – The ArcelorMittal injection wells are located at 250 West U.S. Highway 12 in the City of Burns Harbor in Porter County, Indiana. The current exemption and the proposed reissuance are based on a long term average injection rate for the wells of 175 gallons per minute (gpm) averaged over one-month periods, for a total of 92,043,000 gallons per month for SPL #1 and 300 gpm averaged over one-month periods for a total of 157,788,000 gallons per month for WAL #1, WAL #2, and WAL #3 combined. The long term average rate limit is used to bound the area of the waste plume so that the plume will be no larger than the area estimated in the petition. The rate at which ArcelorMittal may inject is also limited by the maximum allowable surface injection pressure.

C. Today's Proposed Decision – On June 5, 2013, ArcelorMittal requested that EPA modify the exemption from the land ban published in the Federal Register on October 25, 2010. EPA reviewed this submission and requested additional information. Based on the additional supporting documents received on October 30, 2013, EPA has determined that ArcelorMittal has demonstrated, to a reasonable degree of certainty, that any fluids injected will not migrate vertically out of the injection zone or laterally to a point of discharge or interface with a USDW within 10,000 years. Therefore, EPA proposes to reissue the exemption. EPA intends that the exemption will include the existing SPL #1, WAL #1 and WAL #2 wells, as well as the WAL #3 well that ArcelorMittal constructed in 2012.

II. Basis for Determination

A. Waste Identification and Analysis (40 CFR § 148.22(a)) – ArcelorMittal petitioned EPA, Region 5, to grant an exemption to allow injection of wastes from the processes of coke-making which may bear the RCRA waste code codes D010, D018, D038 into WAL #1, WAL #2, and WAL #3 and steel pickling and galvanizing bearing the RCRA waste code K062 into SPL #1. Under the current exemption and the proposed reissuance, these are the only hazardous wastes that ArcelorMittal can inject. Waste analyses were performed and submitted as supplementary information to the no-migration petition. These analyses were conducted in accordance with the quality assurance standards required by 40 CFR § 148.21(a), and adequately describe the characteristics of the waste.

B. Mechanical Integrity Test Information (40 CFR § 148.20(a)(2)(iv)) – In order to confirm that all injected fluids are entering the approved injection interval and not channeling up the well bore out of the injection zone, 40 CFR § 148.20(a)(2)(iv) requires the petitioner to submit the results of a successful annulus pressure test and a radioactive tracer survey. These tests demonstrate the mechanical integrity of a well's long string casing, injection tubing, annular seal, and bottomhole cement. The four wells at ArcelorMittal passed these tests successfully in

June 2014.

C. Local and Regional Geology (40 CFR § 148.21(b)) – Class I hazardous waste injection wells must be located in areas that are geologically suitable. ArcelorMittal provided site-specific geologic, hydrologic, and geochemical information, including descriptions of the depositional environments of the formations, well logs, cross-sections, well and formation tests, and geologic maps, to support the demonstration of no-migration. The information collected during the drilling of WAL #3 supports the previously submitted information. EPA's evaluation of the structural and stratigraphic geology of the local and regional area determined that the ArcelorMittal facility is located at a geologically suitable site.

1. Identification of Underground Sources of Drinking Water – The lowermost USDW at the site is the Silurian/Devonian aquifer, with a base at 711 feet (Figure 1)[1]. The information collected during the drilling of WAL #3 supports the previously submitted information.

2. Injection Zone – The Injection Zone must have sufficient permeability, porosity, thickness, and extent to contain the injected fluids. The injection zone for the ArcelorMittal facility is composed of the lower Eau Claire Formation, Mount Simon Sandstone and the upper portion of the Precambrian rocks, between 2170 and 4286 feet below the surface. The Injection Zone is composed of the Injection Interval, into which the waste is placed, and the overlying Arrestment Interval (Figure 1) into which the waste may move by diffusion and pressure-driven permeation. Waste is directly emplaced at depths between 2722 and 4286 feet into the lower Mt. Simon Sandstone and the upper portion of the Precambrian rocks, which consists predominantly of very fine- to coarse-grained sandstone. It can accept the volume of waste proposed by ArcelorMittal because it has high permeability and porosity.

The Arrestment Interval, between 2170 to 2722 feet, is composed of the lower Eau Claire Formation and the upper Mt. Simon Sandstone. This is a continuous rock formation of low vertical permeability, which is free of transecting, transmissive faults or fractures over an area sufficient to prevent the upward movement of waste.

The information collected during the drilling of WAL #3 supports the previously submitted information.

3. Confining Zone – (40 CFR § 146.62) – The regulations which specify the minimum criteria for siting Class I hazardous waste injection wells require that the injection zone must be overlain by at least one additional formation which can confine the injected fluids. This formation is known as the confining zone, and it must be (1) laterally continuous, (2) free of transecting, transmissive faults or fractures over an area sufficient to prevent fluid movement, and (3) of sufficient thickness and lithologic and stress characteristics to prevent vertical propagation of fractures. The confining zone at the ArcelorMittal facility is the upper Eau Claire Formation, which is found between 1936 and 2170 feet (Figure 1). It is a 234-foot thick, laterally extensive shale interval interspersed with sand and silt layers. It has no known transmissive faults or fractures within the Area of Review (AOR), and will resist vertical migration because of its low

[1] All depths in this document are referenced to ground surface unless labeled as referenced from the 15-foot Kelly bushing above ground surface. Depths are those in WAL #3; depths in the other wells are similar.

natural permeability.

The confining zone must be separated from the lowermost USDW by at least one sequence of permeable and less permeable strata that will provide added layers of protection by either allowing pressure bleed-off (high permeability units), or by providing additional confinement (low permeability units). Because there is 1225 feet of sedimentary rock between the top of the confining zone and the lowermost USDW, the Agency is reasonably confident that the injected contaminants will not reach the drinking water sources. Within these strata, the Ironton-Galesville Sandstone and the St. Peter Sandstone will act as pressure bleed-off zones. These rock formations are laterally continuous for hundreds of square miles and provide the required additional layers of protection. An existing monitoring well in the Galesville Sandstone is intended to detect migration while it is still many hundreds of feet below the USDW and further enhances the Agency's confidence.

The information collected during the drilling of WAL #3 supports the previously submitted information.

4. Absence of Known Transmissive Faults (40 CFR § 148.20(b)) – There are no known transmissive faults in the lower Eau Claire and the upper Mt. Simon Sandstone, the stratum within the injection zone that will confine fluid movement, or in the overlying upper Eau Claire Formation. The information collected during the drilling of WAL #3 supports the previously submitted information.

5. Seismicity – Indiana is an area of very low seismic risk. Midwestern earthquakes are infrequent, generally of low magnitude, and have epicenters deep within the Precambrian granitic rocks far below the injection reservoir. The earthquakes that have occurred during the last 200 years are the result of movement along faults at much greater depths (10 or more kilometers). The information collected during the drilling of WAL #3 supports the previously submitted information. EPA reviewed information relevant to the possibility of injection-induced seismic activity in detail and determined that permitting injection into WAL #3 should not have any impact on the potential for induced seismicity at the site.

6. Geochemical Conditions (40 CFR § 148.21(b)(5)) – The petitioner must adequately characterize the injection and confining zone fluids and rock types to determine the waste stream's compatibility with these zones. The injection zone is composed mainly of permeable sandstone, with some sections of shale and arkosic sandstone, while the confining zone is composed of interfering shales, fine- to medium-grained micaceous sandstones, and sandy dolomites. The information collected during the drilling of WAL #3 supports the previously submitted information.

D. Wells in Area of Review - Under 40 CFR § 146.63, the AOR of Class I hazardous waste wells is a two-mile radius around the well bore or a larger area specified by EPA based on the calculated cone of influence of the well. The cone of influence is the area within which pressure in the injection interval can raise a column of formation fluid or injected fluid sufficiently to cause contamination of a USDW. Using extremely conservative assumptions, the maximum radius of the cone of influence for the ArcelorMittal injection well is less than four and a half

miles from the well bore. To be more conservative ArcelorMittal used an AOR that extends five miles from the wells.

Under 40 CFR § 148.20(a)(2)(ii), a petitioner must locate, identify, and ascertain the condition of all wells within the injection wells' AOR that penetrate the injection zone or the confining zone. ArcelorMittal conducted a well search over the AOR and found that there are six wells penetrating the top of the confining zone within this distance. Because these wells are properly plugged, completed, or abandoned, a corrective action plan is not required under 40 CFR § 148.20(a)(2)(iii).

Drilling and construction of WAL #3 did not change the AOR.

E. Quality Assurance and Quality Control (40 CFR § 148.21(a)) – ArcelorMittal has demonstrated that adequate quality assurance and quality control plans were followed in preparing the petition and the request for reissuance. Data collected prior to 1988 (before the requirements for the no-migration demonstration were promulgated) were collected in accordance with well-established industry standards, including those for quality control. Procedures for testing carried out since the requirements were promulgated were reviewed and given informal approval as necessary. ArcelorMittal followed an appropriate protocol for locating records for penetrations in the AOR, for collection and analyses of geologic and hydrogeologic data, for waste characterization, and for all tasks associated with the modeling demonstration.

III. No-Migration Demonstration

ArcelorMittal chose to demonstrate that waste injected at the facility will remain in the injection zone and will not migrate to a point of discharge or interface with a USDW for a period of at least 10,000 years. This demonstration was based on a showing that a geological model representative of the disposal reservoir and the overlying rock strata would contain the waste constituents within the disposal reservoir for a period of at least 10,000 years under the conditions of the simulation.

A. Model Development (40 CFR § 148.21(a)) – A conceptual model was developed using information developed from logs, core, and other testing carried out during drilling and operation of SPL #1, WAL #1, and WAL #2. The site-specific information used in the model includes hydrogeologic properties of the various rock layers and formation brines, as well as characteristics of the injected fluid. Where site-specific information was not available or necessary, values from peer-reviewed literature or that have been reported in similar situations were used. Where parameters were uncertain, conservative values were chosen.

Some model parameters are uncertain within a range, yet are critical to the predictions of pressure build-up and waste migration. In accordance with 40 CFR § 148.21(a)(6), a range of values for these parameters was modeled in order to determine the sensitivity of the model to the uncertainties, and to predict the "worst-case scenarios." Sensitivity analyses were conducted using less-conservative input values for specific gravity, permeability, natural velocity of groundwater flow, dispersitivity, porosity, effective dispersion coefficient, and viscosity, among

others. This sensitivity testing indicated that the range of uncertainties does not cause significant differences in the predictions of pressure build-up and waste migration, and that input parameters that underestimate the ability of the injection zone to contain the waste still lead to acceptable predictions. The use of conservative assumptions and "worst-case scenario" parameters ensures that the no-migration demonstration is conservative.

The predictions of pressurization and the vertical and lateral movement of waste constituents were made using the DuPont suite of subsurface flow and pressure models. The suite includes five different computational routines for predicting the pressure build-up caused by injection, and the lateral and vertical movement of the injected waste. The purpose of the waste transport models is to predict the outer boundary in either the horizontal or vertical direction beyond which no waste will pass during the predicted time period.

The information collected during the drilling of WAL #3 supports the previously submitted information.

B. Model Verification, Calibration, and Validation (40 CFR § 148.21(a)(3)) – The computer codes used in the DuPont models have been verified by comparing their results with those of analytic and numerical solutions published in literature. The model was calibrated by incorporating historical data from pressure fall-off tests into the representation of the Mt. Simon layer in the DuPont multilayer operational pressure model. The measured average transmissibility indicated by historical pressure fall-off tests is 103,778 millidarcy-feet/centipoise for the entire Injection Interval. This value, together with values for interval thickness and porosity as determined from geophysical well logs and cores, and model boundary conditions, are inputs to the calibration model. The model is validated by repeated success in reproducing calculated flowing bottomhole pressures.

C. Model Predictions – Two simulated time periods were considered in the demonstration: a 58-year operational period and a 10,000-year post-operational period. The operational period included actual historical injection rates through December, 2005, and a projected maximum injection rate of 175 and 300 gpm for 21 additional years through December 31, 2027. The rate history, together with appropriate assumptions and methods of contaminant transport, determined the distance of waste migration in the year 2027, and the maximum pressure build up in the injection zone. The post-operational period was modeled to predict the maximum vertical and horizontal migration of the waste plumes after 10,000 years.

1. Pressure – Maximum pressure buildup, which occurs at the end of the operational period, was predicted by the DuPont Multilayer Pressure Model. The model incorporates multiple layers representing stratigraphic units at the well site. The model has conservative assumptions, such as neglecting compressive storage in aquitards, which would reduce pressure in the injection interval. The maximum predicted pressure increase is 772.6 pounds per square inch at the WAL well sites and 572.4 pounds per square inch at the SPL #1 well site, which occurs at the end of the operational period.

2. Vertical Migration – The DuPont Vertical Permeation Short-Term Model predicted the extent of pressure-driven vertical movement during the operational period. The model

incorporates multiple layers representing stratigraphic units at the well site. Conservative assumptions include a high value for the permeability of the shale caprock, equal density of formation brine and the waste stream, and elevated pressure at the top of the injection interval (as determined by the pressure model described above). The maximum predicted migration distance is less than 0.9 foot into the 552 foot thick arrestment interval.

ArcelorMittal used the DuPont Vertical Permeation Long-Term Model and the DuPont Molecular Diffusion Model to predict the extent of vertical movement of hazardous constituents during the 10,000-year post-operational period. A maximum contaminant concentration at the top of the injection interval was assumed. As pressures relax in the post-operational period, vertical permeation is only slightly sensitive to the effects of pressure-driven permeation and anthropogenic activities (accounting for <0.9 feet of permeation). Molecular diffusion overwhelmingly accounts for contaminant transport at this time scale, and the predictions of vertical permeation depend primarily on the effective diffusion coefficients of the contaminants in the represented types of rock formations. With the conservative assumption that diffusion occurs freely in the more permeable layers, the maximum predicted vertical permeation for the waste ammonia liquor is 29 feet above the lower Mt. Simon Sandstone. The maximum predicted vertical permeation for the spent pickle liquor is 55 feet above the lower Mt. Simon Sandstone. Thus, the waste will be contained well within the 552-foot arrestment interval (Figure 1).

3. Lateral Migration – Lateral migration of the waste plume within the injection interval was modeled during both the 58-year operational period and the 10,000 year post-operational period. Several conservative assumptions were used to maximize the size of the waste plume in order to present "worst case scenarios" of plume migration. The edge of the waste plume is defined as the horizontal distance from the wellbore at which the concentrations of both hazardous constituents (chromium and hydrogen ion) are at least 1,000 times less than their maximum concentrations at the well head. At this concentration ratio, the predicted outer edge of the plume meets Health Based Limits even if the concentrations of hazardous constituents in the waste stream were much greater than historical values. In the model, the future injection rate is overestimated at 175 gpm for SPL #1 and 300gpm for WAL #1, WAL #2, and WAL #3 and the thickness of the injection interval was reduced to 270 feet. Dispersion caused by geologic heterogeneities and density differences between injectate and formation brine is incorporated by using a conservative multiplication factor of 43.9 for spent pickle liquor and 24.2 for waste ammonia liquor, which increases the size of the plume.

ArcelorMittal used the DuPont Basic Plume Model to predict the maximum distance of lateral waste plume migration during the operational period. At the end of the projected 58-year operational period, the distance from the center of the plume to the edge (determined at the one part per thousand concentration ratio) is 14,140 feet from the waste ammonia liquor well and 11,315 feet from SPL #1. Therefore, the plumes would be less than three miles from the well, which is within the AOR.

The DuPont 10,000-Year Waste Plume Model was used to simulate plume migration during the 10,000 year post-operational period. It considered advection caused by both density drift and the natural groundwater flow within the lower Mount Simon Sandstone, as well as hydrodynamic dispersion. Regional hydrogeologic studies of the lower Mount Simon Sandstone suggest that

the rate of regional flow is less than 0.5 ft/year. A groundwater velocity of 0.5 ft/year was used in the DuPont 10,000-Year Waste Plume Model. The specific gravity of the waste ammonia liquor injectate averages 0.99 and the specific gravity of the spent pickle liquor injectate averages 1.31, while that of the formation brine is 1.05. The density difference between the waste ammonia liquor and the formation brine, along with a formation dip of 25 feet per mile, causes the injectate to move up-dip as it rises over time. Because the waste ammonia liquor will move up-dip, the groundwater flow was not included in the calculation. This was done to maximize the distance the waste ammonia liquor plume would travel. For the spent pickle liquor injectate the density difference between the injectate and the formation fluid, along with the formation dip of 25 feet per mile, cause the injectate to move down-dip as it sinks beneath the formation brine. The dip and the groundwater flow are in the same direction, maximizing their effects on plume migration. Values for longitudinal and transverse dispersivities were calculated using published methods. Advective and dispersive transport causes the outer edge of the waste ammonia liquor plume to migrate approximately 22,500 feet (4.26 miles) up-dip (west) from the wellbore. The additional distance due to diffusion of benzene (the most mobile constituent in the waste ammonia liquor plume) is 164 feet, for a total distance of 22,664 feet (4.29 miles). Advective and dispersive transport causes the outer edge of the spent pickle liquor plume to migrate approximately 31,000 feet (5.87 miles) from the wellbore. The additional distance due to diffusion is 324 feet, for a total distance of 31,324 feet (5.93 miles). The operational and final plume boundaries are shown in Figure 2.

The nearest point of discharge into a USDW is more than 10 miles away from the facility. Therefore, ArcelorMittal has demonstrated that, to a reasonable degree of certainty, hazardous constituents will not migrate vertically out of the injection zone or laterally to a point of discharge in a 10,000 year period.

The information collected during the drilling of WAL #3 supports the previously submitted information and therefore, ArcelorMittal did not need to re-run the simulation models. Therefore there are no changes in the predicted lateral or vertical extent of the plume or in the calculated pressures.

IV. Conditions of Petition Approval

This proposed reissuance of the land ban exemption for the continued injection of restricted hazardous waste is subject to the following conditions, which are necessary to assure compliance with the standard in 40 CFR § 148.20(a). Non-compliance with any of these conditions is grounds for termination of the exemption in accordance with 40 CFR § 148.24(a)(1). The facility must petition EPA for approval to change any of the following conditions. Exemption modifications and reissuance should be made pursuant to 40 CFR § 148.20 (e) or (f).

1) All regulatory requirements in 40 CFR §§ 148.23 and 148.24 are incorporated by reference;

2) The exemption applies to the existing injection wells, Spent Pickle Liquor #1, Waste Ammonia Liquor #1, Waste Ammonia Liquor #2, and Waste Ammonia Liquor #3, located at the ArcelorMittal facility at 250 West U.S. Highway 12, Burns Harbor, Indiana;

3) Injection is limited to that part of the Lower Mount Simon Sandstone and the upper portion of the Precambrian rocks at depths between 2722 and 4286 feet below ground level;

4) Hazardous wastes denoted by the waste codes D010, D018, and D038 may only be injected into Waste Ammonia Liquor #1, Waste Ammonia Liquor #2, and Waste Ammonia Liquor #3. Hazardous waste denoted by waste code K062 may only be injected into Spent Pickle Liquor #1. Other fluids necessary for well testing, stimulation, etc. may be injected when approved by EPA;

5) The chemical properties of the injectate that will be monitored are limited according to the table below:

Chemical constituent or property	**Concentration Limitation at the well head (mg/L)**
Benzene	220 (maximum)
pH	Minimum pH is zero
Chromium	133 (maximum)
Naphthalene	260 (maximum)
Nickel	50 (maximum)
Phenol	3780 (maximum)
Pyridine	116 (maximum)
Selenium	5 (maximum)

6) The annual average of the specific gravity of the injected spent pickle liquor must be no greater than 1.31; the annual average of the specific gravity of the waste ammonia liquor must be no less than 0.99;

7) The chemical properties of the injectate that defined the edge of the plume in the demonstration are benzene for waste ammonia liquor and pH for the spent pickle liquor;

8) The volume of wastes injected in any month through the wells must not exceed 92,043,000 (for SPL #1) and 157,788,000 (for WAL #1, WAL #2, and WAL #3 combined) gallons;

9) This exemption is approved for the 21-year modeled injection period, which ends on December 31, 2027. ArcelorMittal may petition EPA for a reissuance of the exemption beyond that date, provided that a new and complete no-migration petition is received at EPA, Region 5, by July 1, 2027;

10) ArcelorMittal shall submit monthly reports to EPA containing a fluid analysis of the injected waste which shall indicate the chemical and physical properties upon which the no-migration demonstration was based, including the physical and chemical properties listed in Conditions 5 and 6 of this exemption approval;

11) ArcelorMittal shall submit an annual report containing the results of a bottom hole pressure survey (fall-off test) performed on Spent Pickle Liquor #1, Waste Ammonia Liquor #1,

Waste Ammonia Liquor #2, or Waste Ammonia Liquor #3 to EPA. The survey shall be performed after shutting in the well for a period of time sufficient to allow the pressure in the injection interval to reach equilibrium, in accordance with 40 CFR § 146.68(e)(1). The annual report shall include a comparison of reservoir parameters determined from the fall-off test with parameters used in the approved no-migration demonstration;

12) The petitioner shall fully comply with all requirements set forth in Underground Injection Control Permits IN-127-1W-0001, IN-127-1W-0003, IN-127-1W-0004, and IN-127-1W-0007 issued by the US Environmental Protection Agency; and

13) Whenever EPA determines that the basis for approval of a petition may no longer be valid, EPA may terminate this exemption and may require a new demonstration in accordance with 40 CFR § 148.20.

Date: EPA, Region 5, requests public comments on today's proposed decision to reissue the exemption. Comments will be accepted until DEC 16 2014, 2014. Comments postmarked after the close of the comment period will be stamped **"Late"**. Late comments do not have standing and will not be considered in the decision process. To request a public hearing on this proposal, submit your request in writing on or before << DEC 16 2014, 2014>> stating the issues to be raised.

Addresses: Submit written comments and hearing requests by mail to:

Stephen Roy, Lead Petition Reviewer
United States Environmental Protection Agency, Region 5
Underground Injection Control Branch (WU-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Comments may be submitted by email to roy.stephen@epa.gov.

For Further Information: Contact Stephen Roy, Lead Petition Reviewer, at the above address, by telephone at (312) 886-6556, or by email at roy.stephen@epa.gov.

Signed and Dated: 10/30/2014

AKTinka for Tinka G. Hyde
Director, Water Division

Generalized Well Schematic with a Stratigraphic Column

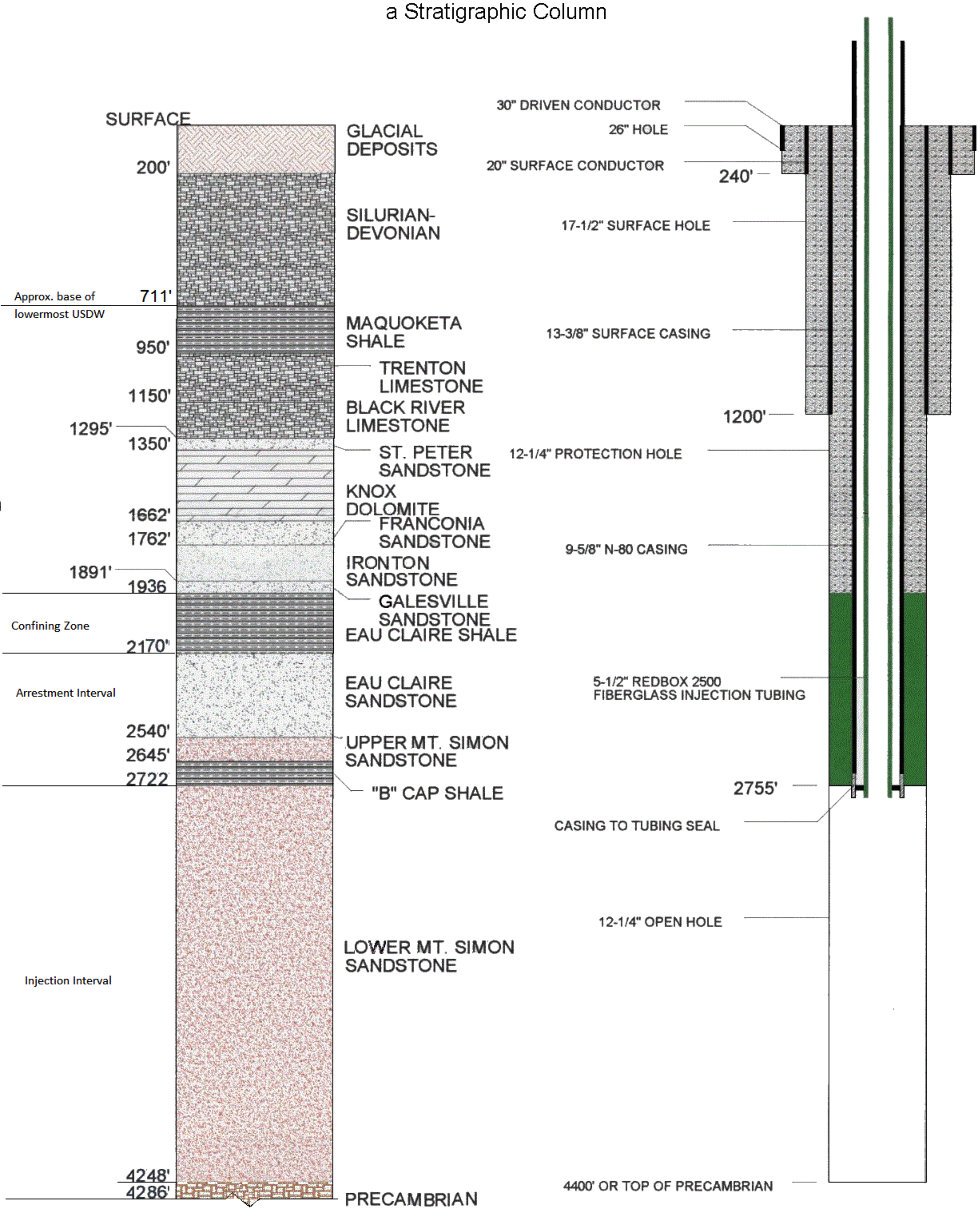

Figure 1. Generalized Well Construction and Stratigraphic Column at ArcelorMittal Burns Harber

Depths are from Well WAL #3; depths in the other wells are similar.

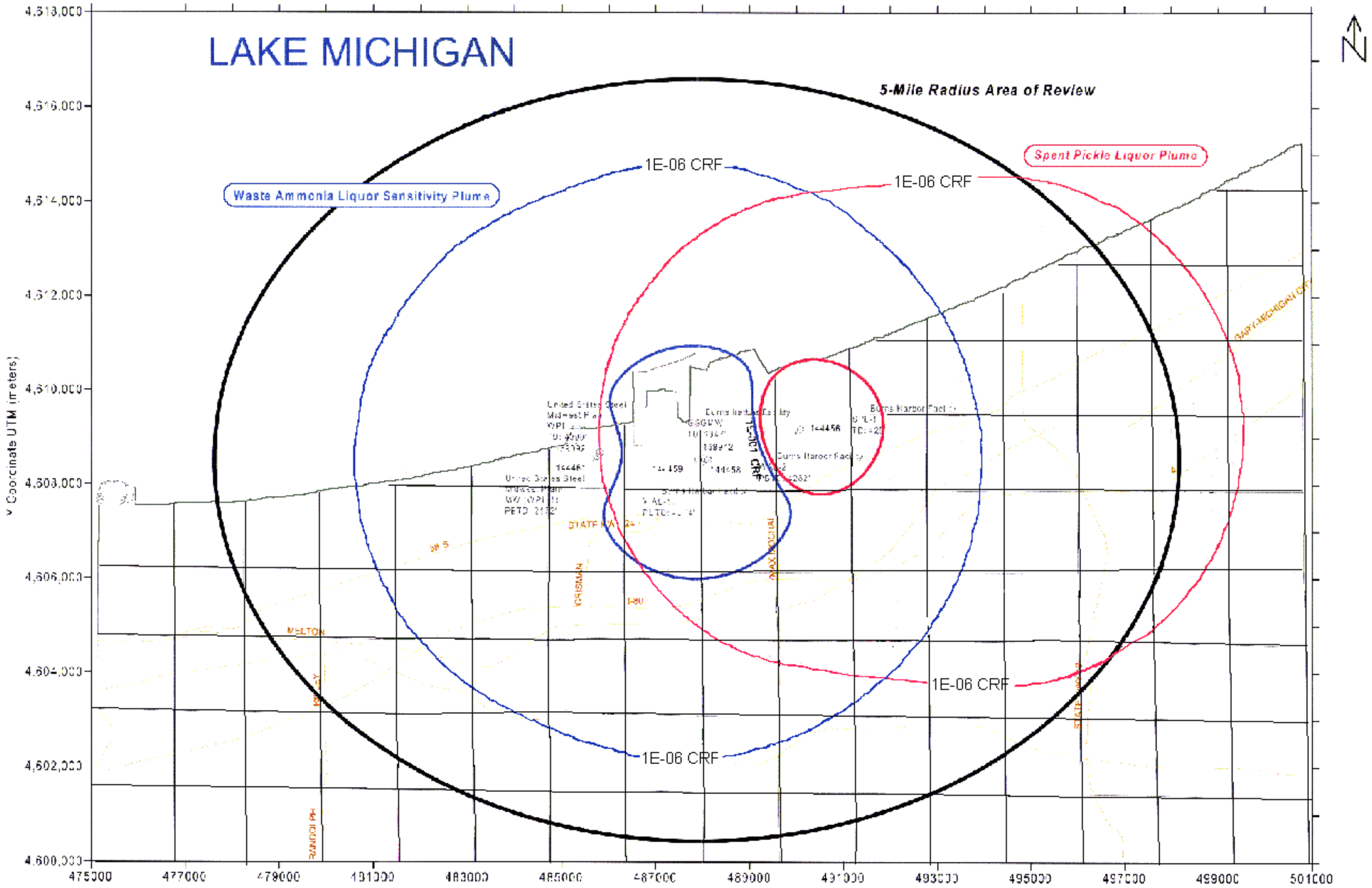

Figure 2. Composite Operational Period and Long-term 10,000 Year Waste Plume Models for the Low-Specific Gravity Waste Ammonia Liquor and High-Specific Gravity Spent Pickle Liquor Plumes (Modified from the No-Migration Petition)

EPA
United States
Environmental Protection
Agency

EPA Plans to Renew Exemption for Hazardous Waste Wells

ArcelorMittal Burns Harbor
Burns Harbor, Indiana November 2014

Comments welcome

EPA encourages your comments on its plan to allow ArcelorMittal Burns Harbor to inject hazardous waste deep underground through three existing and one new injection wells.

The public comment period closes Tuesday, December 16. It includes the required 30 days for public comment and three additional days for delays caused by mailing.

You may also ask for a public hearing. Send EPA your written request on or before Tuesday, December 16, explaining the issues you want to raise. Submit comments and hearing requests in writing to:

Stephen Roy
Water Division (WU-16J)
U.S. EPA
77 W. Jackson Blvd.
Chicago, IL 60604-3590
312-886-6556
roy.stephen@epa.gov

You may view the proposed decision and fact sheet online at www.epa.gov/region5/water/uic/uicpub.htm#landban, or at the Valparaiso Public Library, 103 Jefferson, Valparaiso, or the Thomas Library, 200 W. Indiana Ave., Chesterton.

If you have questions or need more information, contact **Dr. Stephen Roy** at 800-621-8431, Ext. 66556, or roy.stephen@epa.gov. You may view the Administrative Record, including all data submitted by ArcelorMittal, at EPA's regional office (*address above*). Please contact Stephen Roy for an appointment.

The U.S. Environmental Protection Agency plans to approve a request from ArcelorMittal Burns Harbor LLC to continue injecting hazardous waste deep beneath the earth's surface. The Agency will consider public comments (*see box, left*) before making a final decision.

ArcelorMittal has operated three injection wells at 250 W. U.S. Highway 12 in Burns Harbor since the 1960s. The company has an exemption from EPA – granted first in 1990 and reissued in 2010 – from the federal ban on underground disposal of hazardous waste. The three wells operate under permits from EPA that allow the company to inject waste from steelmaking processes known as steel pickling and galvanizing, and from the coke-making process.

In 2012, ArcelorMittal received an EPA permit and drilled a new well, known as Waste Ammonia Liquor (WAL) #3, at the Burns Harbor facility. The company then asked EPA to modify its existing exemption to include the new well. These requests are called "no-migration demonstrations." EPA reviewed the request and found that the injected waste will stay in deep rock formations for at least 10,000 years and will not threaten any underground sources of drinking water.

EPA plans to include the new well in ArcelorMittal's exemption.

Background

Federal law prohibits the disposal of untreated hazardous waste on the land or into an injection well. The law allows EPA to grant exemptions. To qualify for an exemption, a person or company must show that the injected waste will stay in the injection zone for 10,000 years and will not come into contact with any underground source of drinking water.

Technical information

Wells of this type – which EPA calls Class I wells – must be in geologically suitable areas. ArcelorMittal provided geologic, hydrologic and geochemical information, and test data and logs from the new well to show the facility is at a geologically suitable site.

The wells pump or will pump waste into the lower Mt. Simon Sandstone and the uppermost Precambrian rocks. The "injection interval" is at depths between 2,722 and 4,286 feet below the surface. The deepest underground source of drinking water in this area is 726 feet below the surface, so the waste is 2,000 feet or more below the deepest potential source of drinking water.

Just above the injection interval is the "arrestment interval," known as the upper Mt. Simon Sandstone and the lower Eau Claire Formation, which lies between 2,170 and 2,722 feet below the surface. This layer of rock prevents waste from moving up. There are no faults in the rock through which waste might seep upward. Over the arrestment interval is the "confining zone," which provides additional protection. This is a layer of rock 552 feet thick known as the Upper Eau Claire Formation. All these formations extend for hundreds of square miles.

All Class I wells have an "area of review," or AOR. In this case, to be conservative, the company used an AOR that extends five miles from its injection wells. If there are other wells in the AOR that reach the injection zone, waste under pressure could contaminate supplies of drinking water by moving up through a well near the injection site, or through an abandoned well that was improperly plugged. ArcelorMittal's petition shows five wells in the AOR. All have been properly completed, plugged or abandoned. A corrective action plan is not required.

Conditions of exemption

This proposed reissuance of the exemption is subject to conditions. If ArcelorMittal does not comply, EPA may terminate the exemption. The company must petition EPA for approval of any changes in the conditions. Here are the proposed conditions:

1. All regulatory requirements in 40 CFR §§ 148.23 and 148.24 are incorporated by reference.

2. The exemption applies to the Spent Pickle Liquor No. 1, WAL #1, WAL #2, and WAL #3 wells, all at 250 W. U.S. Highway 12, Burns Harbor.

3. Injection is limited to that part of the Lower Mount Simon Sandstone and the upper portion of the Precambrian rocks at depths between 2,722 and 4,286 feet below ground level.

4. Hazardous wastes coded D010, D018 and D038 may only be injected into the WAL #1, WAL #2 and WAL #3 wells. Waste coded K062 may only be injected into the SPL #1 well. Other fluids necessary for well testing, stimulation, etc. may be injected when approved by EPA.

5. Chemical properties are limited according to this table:

Chemical constituent or property	Concentration Limitation at the well head (mg/L)
Benzene	220 (maximum)
pH	Minimum pH is zero
Chromium	133 (maximum)
Naphthalene	260 (maximum)
Nickel	50 (maximum)
Phenol	3780 (maximum)
Pyridine	116 (maximum)
Selenium	5 (maximum)

6. Annual average of the specific gravity of injected spent pickle liquor must be no greater than 1.31; annual average of the specific gravity of the waste ammonia liquor must be no less than 0.99.

7. Volume of wastes injected in any month must not exceed 92,043,000 (for SPL #1) and 157,788,000 (for WAL #1, WAL #2 and WAL #3 combined) gallons.

8. This exemption is approved for the 21-year modeled injection period ending Dec. 31, 2027. ArcelorMittal may petition EPA for a reissuance of the exemption beyond that date, provided EPA receives a new and complete no-migration petition by July 1, 2027.

9. ArcelorMittal shall submit monthly reports to EPA containing an analysis of the injected waste which shall indicate the chemical and physical properties upon which the no-migration petition was based, including the physical and chemical properties listed in Conditions 5 and 6.

10. ArcelorMittal shall submit an annual report to EPA with results of a bottom hole pressure survey (fall-off test) of one of the four wells. The survey shall be done after shutting in the well long enough to allow the injection interval pressure to reach equilibrium, in accordance with 40 CFR § 146.68(e)(1). The annual report shall include a comparison of reservoir parameters determined from the fall-off test with parameters used in the approved no-migration petition.

11. The petitioner shall fully comply with all requirements in EPA's UIC Permit IN-127-1W-0001, IN-127-1W-0003, IN-127-1W-0004 and IN-127-1W-0007.

12. If EPA determines the basis for approval of a petition may no longer be valid, EPA may terminate the exemption and require a new demonstration in accordance with 40 CFR §148.20.