BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED AMENDMENTS TO CLEAN	)	
CONSTRUCTION OR DEMOLITION	)	R12-9(B)
DEBRIS (CCDD) FILL OPERATIONS:	)	(Rulemaking –Land)
PROPOSED AMENDMENTMENTS TO 35 Ill.	)	
Adm. Code 1100	)	
	)	

NOTICE OF FILING

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ATTACHED SERVICE LIST

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Illinois Pollution Control Board the ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S POST-HEARING COMMENTS, copies of which are herewith served upon you.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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DATE: 8-1-2013

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S POST-HEARING COMMENTS

The Illinois Environmental Protection Agency ("Agency") hereby files Post-Hearing Comments in accordance with the Hearing Officer Order issued June 12, 2013. The comments are organized into two sections. The first section addresses the importance of groundwater monitoring at CCDD fill operations and uncontaminated soil fill operations ("USFO") and the legal and policy reasons for requiring it. The second section includes additional information promised by the Agency at the hearing on May 20, 2013. The second section also includes Agency responses to certain written and oral testimony provided at the hearing.[1]

I. GROUNDWATER MONITORING SHOULD BE REQUIRED FOR FILL OPERATIONS

The Pollution Control Board's ("Board") adoption of groundwater monitoring at fill operations is essential if compliance is to be achieved with the state's long-standing policy of restoring, protecting and enhancing the groundwater of the state as a natural and public resource. Meeting this policy goal clearly requires a proactive rather than passive approach when addressing potential sources of groundwater contamination such as the fill operations. There is

[1] The absence of comment in this document on any other matters contained in the record should not be construed as acquiescence or agreement by the Agency for positions or revisions not otherwise expressly endorsed.

simply no question of the legislative intent to protect the state's groundwater resources primarily by the prevention of groundwater contamination. Chances are not to be taken with the state's groundwater resources.

Section 11(b) of the Environmental Protection Act ("Act") states the policy of preservation and prevention in no uncertain terms:

> It is the purpose of this Title [Title III: Water Pollution] to restore, maintain and enhance the purity of the waters of this State in order to protect health, welfare, property and the quality of life, and to assure that no contaminants are discharged into the waters of the State, as defined herein, . . . or from any source within the State of Illinois, without being given the degree of treatment or control necessary to prevent pollution or without being made subject to such conditions as are required to achieve and maintain compliance with State and federal law; . . . .

415 ILCS 5/11(b) (2010) (emphasis added). The policy is echoed in the Illinois Groundwater Protection Act ("IGPA"):

> It is the policy of the State of Illinois to restore, protect and enhance the groundwaters of the State, as a natural and public resource. The State recognizes the essential and pervasive role of groundwater in the social and economic well-being of the people of Illinois, and its vital importance to the general health, safety, and welfare. It is further recognized as consistent with this policy that the groundwater resources of this State be utilized for beneficial and legitimate purposes; that waste and degradation of the resources be prevented; and that the underground resource be managed to allow for maximum benefit of the people of the State of Illinois.

415 ILCS 55/2(b) (2010) (emphasis added). Groundwater is a resource of such current and future value that the State, its subdivisions, and "any person" may take legal action to prevent contamination of the resource so that current and future uses are not precluded and the beneficial uses of the resource are preserved. 415 ILCS 5/12(a), (d); 5/31(d); 5/3.315 (2010); 35 Ill. Adm. Code 620.115, 620.301, 620.401, 620.405.

The legislation requiring this very proceeding directs the Agency to propose and the Board to adopt rules that include standards and procedures necessary to protect groundwater.

415 ILCS 5/22.51(f)(1), 22.51a(d)(1). The Board has placed its reliance for protection of groundwater on the conservative, health-based maximum allowable concentrations ("MACs") of chemical constituents and the perceived ability of the strengthened soil screening requirements (*i.e.*, certification requirements, load checking) to exclude all contaminated soils from the fill operations.

The Agency appreciates the Board's support in adopting the uniform, health-based MACs and agrees the strengthened screening requirements increase the likelihood that contaminated soils will be excluded from fill operations. However, the Agency's administration of its programs and cleanups over decades leads it to conclude that the screening procedures themselves do not provide the level of protection necessary to comply with the MACs and the legislature's stated policy to ensure the prevention of groundwater contamination at fill operations. The Agency is convinced that only groundwater monitoring can provide the information necessary to fully understand and evaluate the threat from fill operations and to ensure the threat is addressed in a timely manner if it materializes.

If the Board chooses not to adopt groundwater monitoring at fill operations, there will be no mechanism by which the legislature or anyone else will be able to judge whether the legislature's directive to protect groundwater is being achieved. Moreover, there will be no mechanism by which groundwater contamination can be identified at a stage sufficiently early to take preventive or corrective action. Without groundwater monitoring, discovery of any groundwater contamination from fill operations will occur only after the opportunity for protection of the resource has passed. If the contamination of potable water supply wells and sensitive natural areas becomes the default mechanisms by which the success or failure of the soil screening requirements ultimately will be judged, the rule cannot be said with any certainty

to be protective of groundwater. Knowledge of a failure will be gained only after off-site impacts have occurred and only through detection by communities or well owners who had nothing to do with creating the conditions leading to the contamination.

The potential for fill operations to cause groundwater contamination is undeniable – even at fill operations making good faith efforts to comply with the soil screening requirements. Excess soil generated at an unknown number and variety of construction and demolition sites throughout the state will from time to time contain contaminants, and at least some of this contaminated soil is expected to find its way to the gates of fill operations. Exclusion of contaminated soils at fill operations depends entirely on the effectiveness and the consistency of application of the soil screening requirements. The Agency has explained in detail the limitations of the certifications and the load checking procedures required for fill operations. Illinois Environmental Protection Agency's Comments on Groundwater Monitoring, P.C. # 62 at 10 – 13.

Mr. Hall and Mr. Quinn each testified they believe the soil from construction/demolition projects poses an environmental risk but for the screening and certification procedures. Testimony of Bret Hall, Tr. 6 at 178; Testimony of Josh Quinn, Tr. 6 at 181. Mr. Lansu's testimony documents the acceptance at the Reliable Lyons CCDD site of "more than 700,000 cubic yards of fill each year from primarily urban and industrial construction projects" for a total of approximately 6,000,000 cubic yards since 2006. Pre-Filed Testimony of Brian Lansu, Exh. 57 at 1. It is simply not credible that no source site owner/operator will ever fail for any reason to make an accurate assessment of potentially impacted property for purposes of certification; that P.E.s/P.G.s will always be able to identify and take their samples from the most contaminated locations of the soil for purposes of certification; that all of the gate personnel at all

of the fill sites will always be able to apply the highest level of scrutiny and diligence to all the loads of soil arriving at the gate; that visual/olfactory observations are effective for any but the most obvious manifestations of a limited number of contaminants; that photo-ionization detectors ("PID") are effective for all contaminants that might be found in soil and contribute to groundwater contamination; that PIDs will never be improperly calibrated, will never malfunction, and will always be accurate indicators of contaminants regardless of external interferences or conditions such as cold weather.

In fact, the record documents exceedances of MACs at fill operations. The sampling exercise conducted in the fall of 2012 by the Agency identified exceedances of the MACs and/or the pH limits at ten of the twelve CCDD facilities where surface samples from the active fill face were taken and analyzed for metals, semi-volatile organic compounds, and pH. Pre-Filed Testimony of the Illinois Environmental Protection Agency, Exh. 63 at 9. Mr. John Hock, testifying on behalf of the Illinois Association of Aggregate Producers, stated his firm had collected samples for analysis at three CCDD fill operations and reviewed data from one additional site. Mr. Hock reported finding seven detections of PNAs above the proposed MACs in 44 samples taken from 44 borings. Because the proposed MACs for certain metals were different at the time of Mr. Hock's testimony than the MACs based on the methodology adopted in the final rule, the number of exceedances for metals is uncertain. However, it appears from the testimony that exceedances would have been detected for arsenic and iron and probably for nickel and mercury. In addition, there were exceedances of the pH limits. Pre-Filed Testimony of John Hock, P.E., Exh. 12 at 3 – 5; Testimony of John Hock, P.E., Tr. 2 at 37 – 42.

The Agency also has determined that potentially contaminated soil arrives at the gates of fill operations despite the strengthened certification requirements, only to be turned away based

on photo-ionization detector ("PID") readings. Since the May 20th hearing, the Agency has reviewed the 417 rejection sheets received from fill operations from September 2012 through June 2013. This period was selected for review because the strengthened certifications were in effect after the effective date of the Part 1100 amendments on August 27, 2012. Of the 417 rejected loads, 269 (64.5%) were rejected based on PID readings ranging from a low of 0.1 ppm to 185 ppm. A PID detection in excess of the calibration level does not identify the specific volatiles detected or the concentrations, so exceedances of the MACs cannot be confirmed based on this information.[2] However, the PID readings do indicate that additional evaluation of the soil for possible volatile organic compound ("VOC") contamination is required. Just as importantly, if not more so, there is no method similar to the PID for identifying at the fill operation gates semi-volatile organic compounds ("SVOC"), poly-nuclear aromatic hydrocarbons ("PAH"), metals, or other non-volatile contaminants. Compliance with MACs for these chemical constituents depends entirely on the certification procedures.

One begins to see how limited this front-end "protection" really is when one considers that certifications are essentially the only source of screening out contaminants other than VOCs. Further, the source site owner/operator is allowed to self-certify under Section 1100.205(a)(1)(A) when the property is not a potentially impacted property. The self-certification does not require P.E./P.G. involvement or sampling and analysis of the soil. The Illinois Association of Aggregate Producers provided figures comparing the number of self-certifications with P.E./P.G. certifications accepted from 2010 through early 2012 by four fill sites in northeastern Illinois: Prairie Materials, Hanson Material Service, Bluff City Materials, and Reliable Materials Lyons.

[2]The limitations of PIDs have been discussed at length by the Agency in testimony and comments. *See* PC # 62 at 12 – 13.

Illinois Association of Aggregate Producers, First Notice Comments, P.C. # 34 at 2. Of the totals provided by facility and year, self-certifications ranged from 53% to 84.5% of the total soil certifications accepted at these facilities.[3] Therefore, the majority of the soil going to these fill sites is not subject to the greater front end controls of PE/PG certification or sampling and analysis to confirm that the soil is uncontaminated. As a result, there is no protection afforded the majority of the soil except for PID screening.

The Office of the Attorney General has testified that it has taken enforcement action for regulatory violations at CCDD fill sites "that clearly call into question the ability to determine the nature of materials accepted by these facilities . . ." *See* Pre-Filed Testimony of the Attorney General's Office, Exh. # 35 at pp. 26-28 (citing eleven enforcement actions under the Part 1100 rules against CCDD fill sites prior to the 2012 amendments and two enforcement actions since the 2012 amendments alleging numerous violations of load checking, recordkeeping and training requirements). Whether such violations are willful or inadvertent is irrelevant if they eventually lead to groundwater contamination. The point is that the only way to discover groundwater contamination, regardless of its cause, is to require groundwater monitoring. Clearly, the Office of the Attorney General's point is that the screening requirements do not justify the "Board's confidence that soil certifications and load checking procedures are adequate to ensure the protection of the State's groundwater." The Office of the Attorney General's Public Comments Regarding the Necessity for Groundwater Monitoring, PC # 63 at 11; *see also* The Office of the Attorney General's Responses to the Board's Pre-Filed Questions, Exh. 59 at 7.

[3] The figures were gathered prior to the strengthening of the certification procedures, but it's not clear whether the enhanced procedures would alter the percentages of owner self-certifications substantially if at all. The Agency also understands that some fill operations require sampling and analysis for all loads. However, this is not a regulatory requirement, there are no data on how widespread the practice is, and there is no assurance whatsoever the facilities requiring this practice will continue to do so until closure.

Another consideration that has been developed more fully in Docket B is the likelihood of current groundwater contamination from fill operation acceptance practices prior to the 2006 adoption of the initial Part 1100 rules, and during the period between the 2006 adoption and the 2010 statutory interim requirements. The Office of the Attorney General, Will County and Mr. Huff have all raised this issue. Pre-Filed Testimony of the People of the State of Illinois by Steven Sylvester, Exh. 59 at 6 – 7; The Office of the Attorney General's Public Comments Regarding the Necessity for Groundwater Monitoring, PC # 63 at 11 – 13; Pre-Filed Testimony of Will County by Stuart Cravens, Exh. 55 at 5; Pre-Filed Comments of James E. Huff, P.E., PC # 59 at 1 – 4; Testimony of Larry Walsh, Will County Executive, Tr. 6 at 14. Although Section 3.160(b) of the Act authorizes only the acceptance of "uncontaminated soil" at fill operations, none of the mandatory screening practices in which the Board has so far placed its reliance for the prevention of groundwater contamination were in place prior to 2006. Only the limited load checking requirements were in place between 2006 and mid-2010. The fill site operators will say there is no proof of current groundwater contamination[4], but this is scant reassurance given there is no groundwater monitoring requirement or reporting requirement and therefore no systematic effort to resolve the issue either way. Once contaminated soil has been accepted at fill sites, contamination very likely will migrate to groundwater. The following factors will contribute to that likelihood. Large volumes of soil will be collected over periods of many years at many such facilities. The fill operations will collect mostly acidic precipitation throughout the course of their operations that will infiltrate the materials placed at the sites. Illinois

[4] See Pre-Filed Testimony of the Land Reclamation & Recycling Association by Brian Lansu, Exh. 57 at 1 – 2; Testimony of Gregory Wilcox, P.E., Tr. 6 at 64 – 65. However, sampling of dewatering discharges deserves little or no credence as an indicator of the absence of groundwater contamination, in the Agency's opinion, because of the dilution created by drawing large volumes of off-site groundwater to the fill operation to create the cone of depression necessary for dewatering.

Environmental Protection Agency's First Notice Comments, PC # 39 at 17 – 19. The placement of soils and other materials frequently extends well into the saturated zone of the local geology. There is a nearly complete absence of technological controls (*e.g.*, liners, leachate collection, impermeable cover) to prevent the migration of contaminants to groundwater. The installation or retrofitting of design controls such as liners in former quarry operations is impractical. Once facilities that dewater shut off their dewatering pumps, the natural flow of groundwater will return and contamination will migrate off-site. Many of the facilities are located in areas (1) geologically susceptible to groundwater contamination; (2) with significant and increasing current and future demand for fresh water, and (3) within 2500 feet or less of hundreds of existing community water supply ("CWS") wells, non-community water supply wells, and private water wells.

The costs of groundwater monitoring are reasonable, especially when compared to the costs of landfilling the soil, the costs of response actions for groundwater contamination, and the present and future costs of the loss of groundwater resources in areas of the state where their presence is critical, now and in the future. Pre-Filed Testimony of Richard P. Cobb, P.G. Exh. 26 at 17 – 18; Testimony of Rep. Larry Walsh, Jr., Tr. 6 at 9 – 10; Testimony of Sen. Pat McGuire, Tr. 6 at 11 – 13; Testimony of Larry Walsh, Will County Executive, Tr. 6 at 15 – 17. In addition, through tipping fees the fill site owner/operators may reallocate the costs of groundwater monitoring to the source site owner/operators disposing of soil in the fill sites. Waste Management of Illinois, Inc., representatives of Will County, and the Agency all have presented figures showing that the increased cost for groundwater monitoring per cubic yard of fill material is just a fraction of the current tipping fees per cubic yard. Supplemental Public Comment Regarding Groundwater Monitoring Costs Submitted by Waste Management of

Illinois, Inc., PC # 33a at 1 – 2; Comments of Lawrence M. Walsh, Will County Executive, and James G. Moustis, Will County Board Chairman, PC # 55 at 1-2; Pre-Filed Testimony of Will County and Stuart Cravens, Exh. 55 at 3; Illinois Environmental Protection Agency's First Notice Comments, PC # 39 at 24 – 27; Illinois Environmental Protection Agency's Comments on Groundwater Monitoring, PC # 62 at 21 – 23; Illinois Environmental Protection Agency's Pre-Filed Testimony, Exh. 63 at 9.

The best evidence of whether fill operations cause or contribute to groundwater contamination would be groundwater monitoring results at fill operations demonstrating for a sufficient period of time whether there is groundwater contamination attributable to fill operations. The only way this information will be obtained is if groundwater monitoring is required. The most reasonable conclusion that can be drawn from the evidence presented in this proceeding is that, as summarized above, there is some level of risk of groundwater contamination from fill operations. However, no one can quantify the risk until there is systematic groundwater monitoring at fill operations. At present no one has been looking for groundwater contamination. There is no requirement to report it if it is found. And, nothing in the record demonstrates that fill operations have not and will not cause groundwater contamination.[5]

The question at this point is how the Board will allocate the risk of groundwater contamination. Will the Board allocate the risk to the source site and fill site owner/operators by adopting groundwater monitoring? Or, by not adopting groundwater monitoring, will the Board allocate the risk to well owners and communities that depend on the groundwater resource for

[5] The Agency and the Office of the Attorney General have presented evidence of groundwater contamination at the Einoder site near Lynwood, Illinois based on the first round of groundwater sampling following an enforcement action. Mr. Huff has presented information about a site in Kane County, Illinois at which he found no groundwater contamination. Neither site presents a definitive answer to the question.

potable water and development, to sensitive natural areas, and to the resource itself? Because well owners will not necessarily know if or when the risk materializes, it will difficult for them to protect themselves. Community water supply owner/operators may discover contamination sooner than other well owners because they are required to conduct regular testing. Nonetheless, if contamination is discovered in a community water supply well many people may be impacted and treatment or other response actions may be necessary and costly. Private wells do not have to be routinely tested like community water supply wells, but contamination may be discovered only if periodic chemical analysis is conducted like community water supply wells. If no chemical analysis is performed, private well owners conceivably may be exposed unknowingly for indefinite periods to contaminants with potential health effects. Taste and odor concerns will become apparent only for a few contaminants before maximum contaminant levels are exceeded. If a private well is impacted there is no practical way to provide treatment of the water. An alternative water supply will have to be developed quickly, which may require public resources especially if many wells are impacted. Costly investigations and litigation could follow. On these and related matters, the testimony on behalf of Will County from Representative Walsh, Senator McGuire, Will County Executive Larry Walsh, and Mr. Cravens has very well described the potential scope and effect on human health and economic development if the risk of groundwater contamination is allocated to the groundwater resource and the users of the that resource. These brief scenarios do not begin to touch on the effects on sensitive natural areas and the costs of the loss of future use of the resource.

The Board has expressed concern about the cost of groundwater sampling and analysis to fill site operators. However, the legislature intends for the risk to be allocated to those whose actions create it. Section 2(b) of the Act states the legislature's intention "to assure that adverse

effects upon the environment are fully considered and borne by those who cause them." 415 ILCS 5/2(b) (2010) (emphasis added). It is the actions of the owners and operators of source sites and fill sites whose activities create the risk of groundwater contamination. Allocating to these parties the costs of preventing the risk is not only intended by the Act but reasonable, especially considering what is at stake. Unless the Board is absolutely certain that the concerns of the Agency and others are unfounded, and fill operations are not and never will be a source of groundwater contamination, it should allocate the risks of groundwater contamination to those the legislature clearly intended, to those whose actions have created the risks. The fill site owner/operators can then reallocate the costs through tipping fees to the source site owner/operators who generated the soil in the first place.

II. RESPONSES TO QUESTIONS POSED AT HEARING AND TESTIMONIAL STATEMENTS

A. Responses to the Hearing Officer's Question List

The following questions are from the Hearing Officer Order of June 12, 2013:

1. At page 56 of the transcript, Mr. Rao asked Mr. Cravens whether background levels should be established for all wells or just the upgradient wells if the Board proceeds with groundwater monitoring.

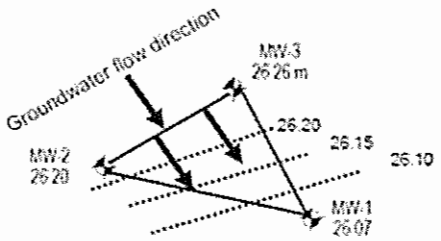
Illinois EPA Response: The Agency is only concerned with the establishment of background levels for upgradient wells. Facilities may wish to determine background in other monitoring wells to establish water quality trends in those wells, but the Agency does not feel that the rules need to require the establishment of background levels in those other wells.

2. At pages 66 - 67 of the transcript, Mr. Rao asked Mr. Wilcox if the groundwater modeling performed at the Bluff City fill site and related facilities to establish the three dimensional flow of groundwater near the Bluff Springs Fen is a typical groundwater assessment for a CCDD facility given the costs of approximately $364,000.

Illinois EPA Response: No, the groundwater assessment conducted for Bluff Springs and the resulting costs incurred there are not typical and the Agency estimates that a typical assessment will cost less. A complex multi-layered 3-dimensional numerical groundwater flow model (e.g., United States Geological Survey's MODFLOW code), such as what was developed for Bluff City Materials, is not needed to establish a basic groundwater monitoring network and the direction of groundwater flow. In the vast majority of cases for the fill sites under this regulation no modeling will need to be conducted to determine the direction of groundwater flow. A simple three point problem can be done on graph paper by hand to define the planar surface of the groundwater (i.e., three points defining the plane) by measuring the observed head elevations in three groundwater monitoring wells screened in the same aquifer. Groundwater flow is perpendicular to this planar surface. The hydraulic gradient can also be determined via this planar surface. For a little more sophistication a person could use a contouring program such as Surfer to create a potentiometric surface. As Mr. Cravens testified, this can be done in half a day or less.

A basic hydrogeology text book describes how to do a three point problem, illustrated below:

Groundwater Characteristics



Calculating direction of groundwater flow direction and hydraulic gradient

1. Need a minimum of three wells
2. Need horizontal distance between wells
3. Identify well with intermediate water level (MW-2 26.20m below ground surface [bgs])
4. Determine where 26.20 m (bgs) is on the line between MW 1 and MW 3
5. Perpendicular line to the dashed line is flow direction
6. Hydraulic gradient is calculated using the change in head over change in horizontal distance

3. Also at pages 66-67 of the transcript, Mr. Rao asked Mr. Wilcox what type of modeling would be typical for a CCDD site.

Illinois EPA Response: See response to #2 above. Typically no modeling is required, only calculations. Modeling might be needed in complex vertical and horizontal groundwater flow regimes such as in the example of Bluff Springs Materials where advective groundwater flow modeling would be helpful. Advective groundwater flow modeling is used to create a predicted potentiometric surface calibrated to the observed potentiometric surface in order to make predictions of changes to this surface in response to a number of different "what if" scenarios and changing conditions, such as pumping stresses.

4. At pages 75 - 77 of the transcript, Ms. Liu asked Mr. Huff if the horizontal component of downgradient groundwater quality is determined using a monitoring well that is screened to capture groundwater from a wide range of depths, would it be necessary to determine

the precise vertical component for the purposes of groundwater monitoring and demonstrating compliance?

Illinois EPA Response: Yes. Groundwater monitoring wells must be screened at appropriate intervals to monitor the permeable zones encountered. The well screen must be of a manufactured type and not less than 5 feet, nor more than 10 feet, in length. Therefore, a well screened over 100 feet (Tr. at 77; 5-10) to capture groundwater from a wide range of depths would not be acceptable. Rather, nested wells (single riser/limited-interval wells) screened at different depths should be used. The intent of nested wells is to isolate a specific zone from which groundwater samples and/or water elevations are to be obtained. If the well screen crosses more than one zone of permeability, the groundwater sample that is collected will represent the quality of the more permeable zone.

Regardless, characterization of the geology/hydrogeology in the immediate vicinity of the fill operation for determining the placement and number of groundwater monitoring wells requires both vertical and horizontal components for the purposes of monitoring and compliance with the Class I groundwater quality standards. The horizontal component alone is not sufficient for either routine groundwater monitoring or when corrective action is required. These components must be defined both vertically and horizontally in order to define the physical characteristics of the pathways for potential constituent migration and to determine the extent and concentration of any constituents in groundwater. This can be accomplished with calculations and does not require modeling.

5. Also at pages 75 – 77, Ms Liu asked Mr. Huff if the vertical component of downgradient

groundwater quality would only be necessary if remediation were to be contemplated.

Illinois EPA Response: See response to #4 above. The horizontal component alone is not sufficient for either routine groundwater monitoring or when corrective action is required

6. On pages 158 – 160, Mr. Rao asked Ms. Blake Myers to comment on Mr. Huff's testimony that eight monitoring wells would be necessary to characterize downgradient groundwater quality in both the horizontal and vertical directions. The reply stated that as few as four wells might be required. Ms. Liu asks under what conditions only four wells might be required "geometrically speaking."

Illinois EPA Response: The conditions under which a site would only need four groundwater monitoring wells would be dependent on, at a minimum: (1) the size of the fill operation; (2) the complexity of the geology/hydrogeology in the vicinity of the fill operation; and (3) the extent (both vertical and horizontal) and concentration of any constituents in groundwater. A precise model cannot be given as there are many variables to any particular site that would require a site-specific evaluation, but the Agency believes a minimum of three wells are needed to establish groundwater flow direction. The need for additional wells, and the number of additional wells, will depend upon site specific conditions.

7. At pages 77 – 78 of the transcript, Ms. Liu asked Mr. Huff to comment on the Agency's cost estimates for monitoring wells in light of Mr. Huff's testimony about establishing the horizontal and vertical components of downgradient groundwater quality requiring at

least eight wells and the development of a complex groundwater model. Mr. Huff doubted the Agency's cost estimates took the development of a complex groundwater model into account. At pages 158 – 160 in response to a question from Mr. Rao, the Agency testified that the Agency's cost estimates took into account obtaining samples representative of groundwater considering both horizontal and vertical directions. The Board asks for additional explanation of the bases for the Agency's cost estimates.

Illinois EPA Response: The Agency's cost estimate for constructing a groundwater monitoring well network for a fill operation included the following assumptions:

1. There would be only one aquifer of concern;
2. The configuration of the piezometric surface of the aquifer would be that of a tilted plane;
3. Three exploratory borings would need to be made to determine the location and orientation of the planar piezometric surface;
4. Two additional borings would need to be made to ensure that the network would have a least one fully upgradient well and one fully downgradient well; and
5. All five borings would be completed as monitoring wells and become part of the groundwater monitoring well network.

8. On the issue of whether rules should address contaminant concentrations for pH greater than 9.0, it was noted the MACs for only two constituents become more stringent as pH values increase – chromium (+6) and selenium.

(a) Would the Agency be able to propose MAC values for Chromium (+6) and

Selenium for pH greater than 9.0 or even just for pH of 12.49? If so, please comment on including just these values for chromium (+6) and selenium solely in Part 1100, so as to not to require opening up Part 742 to make a revision? See Tr. at 161 - 162.

(b) In light of concerns regarding loads being rejected based on pH values greater than 9.0 and because the Agency did not include an upper pH limit in its proposal, please comment on the pH standard adopted by the Board and whether the pH range should be limited to 6.25 and 12.5 as suggested in James Huff's testimony, as opposed to 6.25 to 9.0 as adopted. See Tr. at 78 - 79.

Illinois EPA Response: (a) Yes, the Agency believes values can be established although they will lack the scientific veracity we typically employ. In addition, based on the Agency's calculations, the MACs for Chromium (+6) and Selenium would default to the background concentrations and some organic constituents would also be impacted.

The basis for the Illinois TACO regulation is the U.S.EPA Soil Screening Guidance document with heavy reliance on a companion document, the *Soil Screening Guidance: Technical Background Document* (EPA/540/R-95/128, May 1996). Section 5 of the *Technical Background Document* presents several plots linking soil pH to a chemical property used to determine the leachable quantity of inorganic constituents. The plots for Chromium +6 and Selenium are remarkable because they are linear rather than curvilinear. This opens the opportunity for the Agency to redraw the graph and extrapolate the plot into the pH 9.0 to 12.5 region. The Agency performed this extrapolation by first re-graphing the TACO Appendix C, Table J log k_d values for both Chromium +6 and Selenium in an Excel spreadsheet, then using

the trend function to extend the plotted values. Lacking more exact resources, we approximated the y-axis intersect for log k_d with a ruler at the pH 12.5 level. Using the approximated log k_d values, we calculated the pH 12.5-dependent concentrations using TACO Appendix C, Table A, Equation S17.

This evaluation yielded concentrations of 8.7 mg/kg for Chromium +6 and 0.305 mg/kg for Selenium. Both of these concentrations are well below the respective TACO background values of 16.2/13.0 mg/kg for Chromium +6 and 0.48/0.37 mg/kg for Selenium. Thus, following the procedures of 35 Ill. Adm. Code 1100.605, the MACs would default to the background concentrations should the Board decide to extend the acceptable pH range to a maximum of 12.5.

Furthermore, the MAC values for some organic constituents are also impacted by increasing the acceptable soil pH range. Currently, eight organic constituents are designated as ionizable organics and their MACs are related to soil pH. The MACs for these constituents are the lowest of the pH-dependent concentrations in TACO Appendix B, Table C (see 35 Ill. Adm. Code 742.Appendix B, Table C). Without exception, for these organic constituents, remediation objectives decrease as soil pH increases. As a consequence, the current MACs for these eight constituents are all taken from the Table C column reporting the highest pH (pH 8.75 to pH 9.0). If the trend holds, the MACs for these eight constituents would decrease as pH increases, with the lowest concentrations calculated at pH 12.5. Also, the MAC for several of these eight drops to below their respective analytical detection limit, in which case the detection limit becomes the MAC (see 35 Ill. Adm. Code 1100.605(a)(4)).

(b) The Hearing Officer's question #8(b) asks the Agency to comment on an expansion of the upper limit of the Board's pH range to pH 12.5. The Agency recommends that any expansion of

the upper limit of the acceptable soil pH range under Part 1100 be moderate and not exceed pH 10.0-11.0.

Subsection 1100.600(d)(1) of the rule requires exclusion of soils exhibiting a pH of less than 2.0 or greater than 12.5 based on the USEPA definition of hazardous waste due to corrosivity. The Agency does not agree that the upper limit should be pH 12.5 as we have a concern for soils in the highly caustic range approaching pH 12.5. Resolving that "uncontaminated soil" can contain a constituent up to its hazardous waste level is unreasonable and contradicts the ordinary definition of uncontaminated. Contact with soils around pH 12.5 can result in a caustic burn. Approaching pH 12.5, the allowable concentrations of the inorganics of concern drop below background and objectives for some of the ionizable organic constituents decrease to less than their analytical detection limits (See response to #8(a) above).

The Agency has not previously focused attention on pH values above 9.0 because that is the upper limit of pH-dependent determinations in TACO (See 35 Ill. Adm. Code 742). Currently in TACO, only eight of the 16 pH-dependent inorganic constituents have remediation objective values in the two highest pH ranges (pH 8.25 to 8.74 and pH 8.75 to 9.0). It is the Agency's understanding that the maximum pH of 9.0 in TACO Appendix B, Table C was not employed to establish a limit of safety or to imply a maximum pH expected in Illinois. There are merely limits to the readily available data upon which to develop remediation objectives. However, the absence of data in these ranges of pH does not necessarily indicate potential harm or unfit soil conditions.

In earlier hearings, the Board received testimony from several respondents regarding the range of naturally occurring pH in Illinois soil. Prior testimony focused on the lower limits of naturally occurring soil pH, but often also provided the upper bound of the range. Testimony

included:

- Pre-filed testimony from Mr. James Huff: Attachment 2 of the subject testimony, a circular from the Illinois State Water Survey, reports, "Average soil pH values vary from mildly alkaline (7.0-7.5) to strongly acidic (5.2-5.5) in extreme southern Illinois."
- Pre-filed testimony from Mr. John Hock: Mr. Hock summarizes an investigation employing 44 soil samples by concluding, "The pH of the samples ranged from 7.3 to 11.0 and averaged 8.1".
- Pre-filed testimony of Mr. Brett Hall: Mr. Hall provided the Board with results from 103 sample locations showing ten values over 9.0 with a maximum of 10.43.
- Pre-filed testimony of Ms. Annick Maenhout: Ms. Maenhout provided the Board with pH results from 103 evaluations revealing 15 values over 9.0 with the highest recorded as 10.0.
- Pre-filed testimony of Mr. Greg Wilcox: Mr. Wilcox testified regarding a large dataset of soil pH results. Ranges of the soil pH determinations were reported for 144 sampling rounds including 531 results. Thirty-five results above 9.0 and seven results above 10.0 were reported, with a maximum of 11.1.
- Pre-filed testimony of Dr. William Roy: In his testimony to the Board, Dr. Roy reported results at varying depths from six sample rounds in four northern Illinois counties. No results were above pH 9.0.

The bulk of the above evidence shows that natural soil pH can and will exceed 9.0. However, the evidence also shows that the occurrence of soil pH above 10.0 is low and pH above 11.0 is extremely low. Based on the above, the Agency does not strongly object to the Board extending the upper limit of the acceptable soil pH criterion. However, the Agency recommends that any

expansion of the upper limit of the acceptable soil pH range under Part 1100 not exceed pH 11.0.

9. If the pH range of uncontaminated soil was limited to between 6.25 and 12.5, should the Maximum Allowable Concentrations, or MACs, in uncontaminated soil still be determined based on the lowest pH dependent value in 742, Appendix B, Table C, between the column ranges 6.25 and 9.0? See Tr. at 79 – 80.

Illinois EPA Response: Yes. When constructing the Subpart F, Section 1100.605 MAC determination criteria, the Agency strove to maintain transparency by referencing TACO as the basis for all MAC concentrations. As it stands, each MAC value appears in a TACO table. However, as stated in our response to #8(a) above, calculating MACs for soil pH values above 9.0 will require computations and extrapolations outside of the TACO regulation. These data manipulations could not be performed by a person not fully versed in the TACO processes and in possession of details not included in the TACO regulation. For this reason, the Agency would prefer that the Section 1100.605 procedures for determining MACs not be revised

The follow-up question is whether the current MAC values are sufficiently protective with an expansion of the upper pH limit. The answer is yes, the Agency believes the current MAC values will continue to be protective irrespective of a moderate expansion of the upper range of acceptable soil pH. As stated in our response to #8(a) above, in several instances background values and detection limits will apply in lieu of pH dependant concentrations, which will moderate many MAC reductions that higher soil pH might otherwise compel.

10. Are the number and locations of IDOT and other transportation-related excavations used for CCDD/USF that are exempt pursuant to Section 1100.101(b)(3) known across the State? See Tr. at 139-46.

Illinois EPA Response: The Agency does not have this information.

11. Is information available regarding the geologic conditions at the transportation-related excavations used for CCDD/USF that are exempt from these rules, and how these conditions differ from quarries, mines, or other excavations covered by these rules? See Tr. at 140.

Illinois EPA Response: The Agency does not have this information. This line of questioning was, to some extent, based on an Agency response to IAAP Pre-Filed Question Nos. 3d, 4d, 5d, 8d, 9d and 10d, which asked the open question, "What prevents CCDD or other materials from [transportation projects] dumped into exempt excavations from causing an exceedence of the Class I groundwater quality standards . . .". Although the Agency believes this was clarified at the hearing, in case it was not, the Agency takes this additional opportunity to state it did not testify that transportation-related excavations were statutorily exempt based on geologic conditions and did not intend to imply that was the case. The testimony was that there might be geologic reasons some excavations would be less likely than others to leach contaminants to groundwater, but that transportation-related excavations are not subject to regulatory protections other than the application of the IDOT specifications. To the extent the phrasing chosen resulted in the inference that the statutory exemption was based on geologic conditions, the Agency regrets the use of that phrasing.

12. Are the transportation-related excavations used for CCDD/USF typically smaller than CCDD and uncontaminated soil fill operations? If so, is there less concern regarding the potential for groundwater contamination because of the reduced volume of CCDD/USF materials being deposited? See Tr. at 140, 182-83.

Illinois EPA Response: The Agency does not have specific information about the sizes of the transportation-related excavations. The Agency has testified it believes the large volumes of soil taken at many fill operations are a factor in assessing the threat of groundwater contamination from such operations. Testimony of Stephen F. Nightingale, P.E., Tr. 1 at 35 – 36. It would follow that smaller accumulations of soil might be of less concern. However, the size of the excavation is only one factor to be considered.

13. Do any other states have regulations for a subset of construction and demolition debris, such as clean or uncontaminated debris? If yes, is groundwater monitoring required? See Tr. at 153 - 155.

Illinois EPA Response: The Agency did not research other state's CCDD regulations in preparation for this rulemaking. However, in 2005, during the original rulemaking for Part 1100, the Agency contacted eight states to see how CCDD was regulated in those states. The eight states contacted were: Pennsylvania, Indiana, Wisconsin, Michigan, Minnesota, Ohio, Missouri, and Iowa. With the exception of Minnesota, all states had regulations and/or guidance regarding CCDD or similar material. None of these seven states had groundwater monitoring requirements. Minnesota considers all CCDD to be a waste and requires that it be disposed at a

permitted CCDD landfill. Minnesota requires groundwater monitoring at the permitted CCDD landfill depending on the soils present at the site and the depth to groundwater.

14. Of the nine facilities shown on the map of Will County submitted by Mr. Cravens in his testimony, how many of these are now accepting CCDD or USF, are actively mined, and continuing to dewater with an established cone of depression? For those facilities that are dewatering with an established cone of depression, how long will dewatering continue? See Exh. 55.

Illinois EPA Response: The Agency identified ten CCDD fill operations shown on the map provided by Mr. Cravens as an attachment to his testimony submitted to the Board on May 13, 2013. Based on Agency records, and as confirmed by the Will County Land Use Department, nine of the ten facilities accepted CCDD in calendar year 2011. Based on information provided by the Will County Land Use Department, only two of the CCDD fill operations are currently being mined. See the table below for more detailed information. The Agency does not possess the information necessary to answer the Board's questions concerning dewatering.

WILL COUNTY CCDD FILL OPERATIONS

FACILITY NAME	BOL SITE NO.	Accepted CCDD in 2011?	Currently being mined?
Chicago Street CCDD, LLC	1970455178	yes	no
E F Heil LLC Site 1	1970805144	yes	no
Hanson Material Service Yd 588	1970900001	yes	no *
Orange Crush LLC-Romeoville	1970905104	yes	no

Land & Lakes Clean Fill Site	1970905141	yes	yes
Richards St CCDD	1974450034	yes	no
Elmhurst Chicago Stone Co-Barbers Corners	1978030002	yes	yes
DeBe Land Dev Inc Quarry	1978095150	no	no
FJV Development	1978175017	yes	no
Vulcan-Bolingbrook Quarry A&B	1978200006	yes	yes

*No mining is being done at the CCDD fill operation site but Hanson is mining at an adjacent site.

15. How many CCDD/USF operations across the state are still actively mined, and continuing to dewater with an established cone of depression?

Illinois EPA Response: The Agency does not have this information.

16. Please provide the additional information concerning the groundwater monitoring data included in the Agency's prefiled testimony: the type of facilities sampled, i.e. CCDD or USF fill operations; facility location; sampling protocols, and whether the samples taken were representative of the groundwater underlying the CCDD/USF facilities; and information on any comparisons made between the metal concentrations in the groundwater samples with available statewide area background for metals in soil or groundwater. See Tr. at 110-112. Specifically for the Fall 2012 data indicating an exceedance of benzo(a)pyrene, please identify the location and depth of the fill area and monitoring well(s) where the benzo(a)pyrene exceedance was found. See Tr. at 84-85, 110, Exh. 59 at 8-11, Exh. 63 at 9-10, Exh. 64.

Illinois EPA Response: Pursuant to enforcement, J.T. Einoder, Inc. was ordered to install groundwater monitoring wells at its unpermitted CCDD disposal site in Lynwood, Illinois. Nine monitoring wells (MW) were installed around the site along the north, south, east and west sides of the disposal site in accordance with a plan developed and executed by J.T. Einoder, Inc.. Samples were then taken from MW #7 and MW #9, which were representative of groundwater upgradient from the facility. Samples representative of groundwater downgradient from the facility were taken from MW #2, MW #3, MW #4, MW #5, and MW #6. Samples were also taken from MW #1 and MW #8, which were wells installed through the fill that had been disposed of at the site.

The Agency compared metal concentrations in the groundwater samples from the facility with the Board's Groundwater Quality Standards at 35 Ill. Adm. Code 620 . The monitoring well where benzo(a)pyrene was exceeded was MW #8, which was one of the wells installed through the fill that had been disposed of at the site. All monitoring wells, including MW #8, were drilled to a depth of 27-34 feet.

17. Please comment on whether the Board should consider raising the PID response value to 5.0 ppm as suggested on page 4 of Mr. Huff's testimony. See Tr. at 160 - 164.

Illinois EPA Response: The language of the regulations at Subsection 1100.205(b)(1)(A) requires rejection if the PID gives a reading above "background levels". However, background is not necessarily absolute zero. The Board's order in the original Part 1100 rulemaking, dated April 6, 2006, explains that instruments would be calibrated in a way that accounted for site background. How the instruments are calibrated would be approved in the site's permit.

The Agency is not comfortable raising the PID response value to 5.0 ppm without further scientific evidence of its appropriateness, especially in light of the testimony of Stuart Cravens that, for health and safety reasons, 5.0 ppm would require an air purifying respirator (See Tr. at 164; 1-12).

18. Proposed Section 1100.735 requires groundwater monitoring for all Class I parameters in 35 Ill. Adm. Code 620.410. The Agency stated that the groundwater standards in Part 620 are based on total metals, although some programs require both totals and dissolved, but always totals. Exh.63 at 11.

Mr. Huff raised the issue that monitoring wells in Illinois are often screened in unconsolidated units of silts and/or clays, and a total metals analysis reflects both what is in the groundwater as well as the particulates or sediment in a sample. Exh. 58 at 3. The Agency acknowledged that turbidity in samples has an impact on metals, but developing a well correctly should keep turbidity from becoming an issue. The Agency recommended low flow groundwater monitoring to minimize turbidity. See Tr. at 48-51 (Mr. Cravens); Tr. 114 – 115 (Ms. Blake Myers).

USEPA Region 9's "Field Sampling Guidance Document #1220, Groundwater Well Sampling" stated, "With respect to the ground water chemistry, an adequate purge is achieved when the pH, specific conductance, and temperature of the ground water have stabilized and the turbidity has either stabilized or is below 10 Nephelometric Turbidity Units (NTU). Ten NTU is the (maximum) goal for most ground water sampling

objectives." "Field Sampling Guidance Document #1220, Groundwater Well Sampling", REV. 1, 9/2004, USEPA Region 9 Laboratory, Richmond, California at 13.

To avoid the submission of groundwater monitoring samples from monitoring wells where an adequate purge has not been achieved and the groundwater has not been stabilized, would including a provision that would limit samples submitted for metals analysis (total and/or dissolved) to 10 NTU or less be appropriate?

Illinois EPA Response: The Agency does not recommend adding a nephelometric turbidity units (NTU) factor into collecting groundwater samples for metals from groundwater monitoring wells. NTU's are more appropriately applied to surface water sources of drinking water, as in 35 Ill. Adm. Code 611.

The current processes required under the Board's Groundwater Quality Standards at 35 Ill. Adm. Code 620 address well purging strategies. Subpart E of 35 Ill. Adm. Code 620, specifically Section 620.510, proscribes the sampling and analytical procedures for monitoring. Section 620.125 incorporates by reference the United States Environmental Protection Agency's Practical Guide for Ground-Water Sampling. Pages 89, 90, 111, and 112 of U.S. EPA's Practical Guide for Ground-Water Sampling includes well purging processes that have been in effect since 1991. These processes already address monitoring wells in Illinois that are screened in unconsolidated units of silts and/or clays. The Agency has not been notified during the 22 year period since the adoption of the Board's standards in 1991 that these purging processes do not address the issues being raised by Mr. Huff. This concern was also not brought to the attention of the Agency or the Board during any of the 3 updates to the regulations that occurred since their adoption in 1991. There does not appear to be a need to alter the current

sampling procedures called for in Part 620 specifically for purposes of sampling conducted under Part 1100.

19. Please provide additional information regarding the results from a recent soil sampling exercise submitted by IEPA in response to Board's prefiled Question 3(a) in Hearing Officer order dated April 18, 2013. See Tr. at 149-151.

(a) Please provide additional information on the type of facility (CCDD or uncontaminated soil fill facility), and their location.

(b) Please clarify how many samples were taken at each facility and whether the Agency believes the samples were representative of the soil being accepted at the sampled facilities.

(c) Please comment on whether the Agency has made any comparison of the sampled metals concentrations with background soils in the state.

(d) Do any of the ten facilities monitor groundwater?

(e) If the sampled facilities were in compliance with the existing CCDD regulations, please comment on the reasons for exceedances of the MACs.

Illinois EPA Response: (a) Of the 12 sites sampled, 11 were CCDD fill sites and one was a soil only fill site. The soil only site and one of the CCDD sites are located in McLean County. The remaining 10 facilities are located in northern Illinois. One site was sampled in each of Winnebago, LaSalle, McHenry, and Lake counties. Two sites were sampled in each of Cook, Kane, and Will counties. The facilities that were sampled were selected because they are known to be active and dependably open for business on weekdays. Many sites are closed in the winter

(non-construction season) or when business is slow or when no highway construction sites are nearby.

(b) On average, two samples of fill were taken from each facility and one background sample was collected. Fill samples were collected from a random location on the current active face after confirming either with the operator or by witnessing loads being dumped at the face that the fill was recently dumped. The Agency used either XRF and or PID instruments to field screen sampling locations. Based on those readings, fill samples were collected for lab analysis at the areas with the highest metal indicators on the XRF. Each background sample was taken from a location at the facility that appeared to be unaffected by mining or filling operations. Samples were placed in lab ready bottles, immediately placed on ice and delivered to the Agency lab using the standard chain of custody procedures. However, it may not be appropriate to characterize the samples as representative of soil being accepted at the facilities since the soil being accepted at the facilities is not homogenous and comes from many different source sites.

(c) The Agency did not compare metal concentrations in the soil samples with available statewide area background, but instead compared the metal concentrations to the MACs.

The Agency ran totals for metals analysis because the results were to be compared to the MAC table as required in Section 1100 Subpart F. The MAC table is in mg/kg, which is a measurement of totals. According to Section 1100.610(b), if soil sampling and analysis are used to evaluate compliance with the MAC in uncontaminated soils, compliance generally must be determined by comparing total soil concentrations from the lab reports. The MAC table allows compliance verification for some metals by comparing TCLP/SPLP results to TACO Class I Soil Component of the Groundwater Ingestion Exposure Route objective.

(d) None of the facilities where samples were collected monitor the groundwater.

(e) The Agency cannot say with any certainty why the specific materials with the exceedences were accepted at the facilities. The Agency has testified and commented on numerous occasions (including the reasons stated at pages 4 – 8 of this document) that all of the front-end procedures could be followed and soil with exceedences of the MACs still will find its way into fill operations.

B. Responses to Additional Questions Posed at the Hearing on May 20, 2012

The following are additional questions from the transcript of the hearing:

1. Regarding recent groundwater sampling and analysis at the Einoder (Lynwood) site that was the subject of testimony by the Agency and the Office of the Attorney General, Mr. Huff asked which of the nine wells are the upgradient wells. Tr. 6 at 87, 112. Mr. Huff also asked for information on the development of the Lynwood wells and on how deep the wells are screened. Tr. 6 at 111.

Illinois EPA Response: Nine wells around the Einoder site in Lynwood were installed along the north, south, east and west sides of the disposal site. Monitoring well (MW) #7 and MW #9 are upgradient wells. The downgradient wells are MW#s 2, 3, 4, 5 and 6. MW #1 and MW#8 were installed through the fill that was disposed of at the site. The wells were constructed with two-inch PVC riser with ten foot, 0.001 slot size screens. Flush mounted and stick-up outer well casing was used. The monitoring wells were drilled from 27 to 34 feet. The wells were developed by using a pump to withdraw water from each well until the water was clear and free of sediment or until pH, temperature and specific conductivity stabilized.

2. Regarding recent groundwater sampling and analysis at the Einoder (Lynwood) site, Mr. Huff inquired as to possible remediation options for iron and manganese groundwater contamination. Tr. 6 at 110 – 111.

Illinois EPA Response: The Einoder site in Lynwood is still in the investigatory stage, and no corrective action plan has been developed. However, in general, the Agency's expectation for confirmed exceedences of the groundwater quality standards is that the site would proceed with corrective action consistent with requirements under the proposed Subpart G and 35 Ill. Adm. Code 620. The first step of the response would be to attempt to mitigate impairment by restoring or improving groundwater quality as set forth in proposed Sections 1100.755 and 620.250(a) – (c). For iron or manganese contamination this would most likely consist of preventing additional contamination and pumping and treating existing contamination. The treatment to remove iron/manganese is a sand filter with an oxidizing chemical such as potassium permanganate. This probably also would require an NPDES permit to discharge. After every reasonable attempt has been made to return groundwater quality to the Class I standard or to prevent the preclusion of a use, the applicable groundwater quality standard could be revised and other remedial options could be considered as set forth in Sections 620.250(c) and 620.450(a)(4)(B), as follows:

> (a)(4) After completion of a corrective action as described in Section 620.250(a), the standard for such released chemical constituent(s) is: . . . .
>
> B) The concentration as determined by groundwater monitoring, if such concentration exceeds the standard for the appropriate class set forth in Section 620.410, 620.420, 620.430, or 620.440 for such constituent, and:

i) To the extent practicable, the exceedence has been minimized and beneficial use, as appropriate for the class of groundwater, has been returned; and

ii) Any threat to public health or the environment has been minimized.

These other remedial options (*e.g.*, well replacement, institutional controls) could be considered under subsection 620.450(a)(4)(B)(ii), if concentrations of iron/manganese are still above the applicable groundwater quality standards after completing reasonable attempts to mitigate impairment. Of course, much of this depends on site-specific circumstances, and imminent threats to public health or the environment might have to be addressed more quickly than this description suggests. The key difference is that Mr. Huff advocates making no attempt to mitigate impairment, but instead recommends "writing off" the groundwater by eliminating its use or potential use as a potable water source through the immediate adoption of an institutional control. This approach would be a substantial departure from applicable regulations and the legislative policy discussed in Section I above, and is opposed by the Agency.

Why does the remediation of iron and manganese contamination matter? Iron and manganese cause staining and scaling within plumbing systems. Manganese also has an odor. Further, drinking water contains microorganisms, some of which can cause taste and odor problems, but for the most part are harmless. Iron and manganese bacteria utilize iron and/or manganese to grow and thrive, and, as a result, iron/manganese may create water quality problems up to and including rendering a water supply inoperable. The presence of iron and manganese does not necessarily mean that iron and manganese bacteria are present, but the presence of such bacteria may be a consideration if the well owner has any of the following

problems: well loss of yield; poor pump performance; encrustation of water line/pump; turbidity; red water; objectionable taste or odor; intermittent changes in water quality; or poor performance of hot water appliances (*i.e.*, water heater, dishwasher, clothes washer, and so forth). All of the above could occur at concentrations below the numerical standards. Additional treatment for iron and manganese concentrations above naturally occurring levels that are attributable to fill operations would be an economically and technically unacceptable burden for owners of existing private drinking water system wells, semi-private drinking water system wells, and non-community water system wells.

3. Mr. Huff noted the MAC value for total chromium of 21 mg/kg and asked what percentage of the state exceeds the 21 mg/kg value. Tr. 6 at 118.

Illinois EPA Response: Mr. Huff asks the Agency to estimate what theoretical percentage of rejections due to chromium exceedances would fall within the range of background values. The MAC for chromium is 21 mg/kg and the statewide background concentrations range from ND (<2.14) to 151 mg/kg. The median background values used in 35 Ill. Adm. Code Part 742 (Tiered Approach to Corrective Action Objectives, or TACO) for chromium are 16.2/13.0 mg/kg. The Agency ranked the 261 statewide background concentrations for chromium and determined that 50 values are greater than the MAC. Thus, if the background sample results are representative of statewide conditions, one might anticipate a 19% rejection rate of background caliber soils.

Additionally, Mr. Huff questions the validity of the chromium MAC. Tr. 6 at 78 – 79. Chromium exists in two environmentally relevant forms: trivalent and hexavalent. TACO

incorporates three entries for chromium: trivalent, hexavalent, and total chromium. Each of these entries incorporates unique toxicological factors. The Agency selected the TACO entry for total chromium because it is protective of the migration to groundwater pathway, the most relevant exposure route for deep excavation filling activities. The TACO entry for trivalent chromium should not be used alone because it does not include the more toxic form, hexavalent chromium. The form of chromium that includes toxicological criteria (MCL) for development of a MAC based on protection of groundwater is total chromium.

The U.S. EPA provides the total chromium MCL that has been adopted as the Class 1 Illinois groundwater standard and that is the basis of the TACO Class I soil component of the groundwater ingestion objective. The U.S. EPA justifies a totals value because, "These two forms of chromium convert back and forth in water and in the human body, depending on the environmental conditions." Alternatively, each of the three forms would have to be determined separately in environmental samples and individual criteria applied. Even then, the dynamic conversion from one form to the other would make environmental evaluations very difficult.

The MAC is, as it should be, based on the total chromium entry because it is the only entry to include a migration to groundwater objective -- a critical consideration for CCDD and soil only fill operations. The MAC for total chromium (21 mg/kg) is the lowest concentration in the pH range of 6.25 to 9.0 and is greater than the TACO background values of 16.2 and 13.0 mg/kg. The alternative extraction MAC value is 0.1 mg/L, which is also the Class I groundwater standard. Because hexavalent chromium is the soluble form, exceeding the extraction concentration of 0.1 mg/L, clearly indicates that the chromium content of the tested soil is a concern.

4. Mr. Rao asked if the Agency had received any information from the fill operations that they are having problems with load rejection under the current pH restriction to the 6.5 to 9.0 range. Tr. 6 at 162.

Illinois EPA Response: In response to Mr. Rao's request for information, the Agency reviewed the same set of rejection forms discussed in Section I above in conjunction with PID rejections – 417 forms submitted from September 2012 through June 2013. This set was chosen because the pH standards became effective with the adoption of the Part 1100 amendments on August 27, 2012. It appears that older forms without the pH check box were in use through most of September 2012. Of the remaining 378 forms, only three showed rejections for pH and those were because no pH test results were presented at the fill operation gate by the hauler. Apparently, no additional evaluation of pH is conducted at the fill operation gates if test results are provided. No pH results were provided on any of the rejection forms. Mr. Wilcox's testimony that pH screening is occurring earlier in the process may be the key factor in this result. Testimony of Gregory Wilcox, P.E., Tr. 6 at 163.

C. Responses to Issues Raised in Pre-Filed and Oral Testimony

1. In its Pre-Filed Question No. 3a, the Board noted Mr. Huff's statement that the monitoring cost burden could be eliminated by limiting "the groundwater monitoring to volatile organic compounds and dissolved RCRA metals." Hearing Officer Order of April 18, 2013, Exh. 52 at Attachment A. In this context, the Board requested further

comment on the prevalence of the other Part 620 parameters in CCDD and uncontaminated soil. Mr. Huff then replied by somehow linking the "Illinois Integrated Water Quality Report and Section 303(d) List – 2012," prepared by the Illinois EPA as a basis for eliminating many Part 620 parameters from groundwater monitoring at fill operations including chlorides, nitrates and herbicides. Pre-Filed Testimony of James E. Huff, P.E., Exh. 58 at 1 – 2. Mr. Huff also calls for the exclusion from monitoring parameters of other Part 620 parameters in his written and oral testimony. *Id.* at 6 – 8; Tr. 6 at 73.

Illinois EPA Response: Mr. Huff has equated the monitoring conducted at an ambient network of public water supply wells sampled by the Agency pursuant to Section 13.1(b) of the Environmental Protection Act and Section 7(b)(1) of the Illinois Groundwater Protection Act (IGPA) with dedicated monitoring wells at fill sites. 415 ILCS 5/13.1(b); 415 ILCS 55/7(b)(1). This is a scientifically inappropriate analogy and conclusion made by Mr. Huff. The goal of what is represented by the statistically designed network of public water supply wells is very clearly stated on pages 14 and 15 of the water quality report as follows:

> Section 13.1 of the Act (415 ILCS 5/13.1) requires the Illinois EPA to implement a groundwater monitoring network to assess current levels of contamination in groundwater and to detect future degradation of groundwater resources. Further, Section 7 of the IGPA (415 ILCS 55/7) requires the establishment of a statewide ambient groundwater monitoring network comprised of CWS wells, non-community water supply wells, private wells, and dedicated monitoring wells. The Interagency Coordinating Committee on Groundwater (ICCG) serves as a groundwater monitoring coordinating council. The following provides a summary of the Illinois EPA's network of CWS wells.
>
> From the experience gained from these prototype networks, implemented pursuant to Section 13.1 of the Act, Illinois EPA designed a probabilistic monitoring network of CWS wells (Gibbons 1995). The design of this network was completed in coordination with the USGS, the Illinois State Geological Survey (ISGS), and the ISWS, with USGS

> performing the detailed design. The goal of the network is to represent contamination levels in the population of all active CWS wells. (Emphasis added)

Community water supply (CWS) wells produce large volumes of water. As these wells pump, a cone of depression is created in the potentiometric surface of an aquifer. Further, this cone of depression is superimposed on a regional groundwater flow system and a zone of capture (ZOC) or contributing recharge area is created. A contaminant plume moving along flow path(s) within a ZOC can be mixed with clean groundwater moving toward the well along other flow paths. Therefore, the concentration of a contaminant in such a production well can be masked via dilution by mixing with clean groundwater within the zone of capture. A high volume production well cannot be compared to a dedicated groundwater monitoring well at a fill site. Thus, Mr. Huff's conclusion that groundwater monitoring for chlorides, nitrates and herbicides should be eliminated based on the results of the report is unsupported.

Mr. Huff would go even further on the elimination of groundwater monitoring parameters based on a tenuous distinction between urban and rural areas of the state and the resulting conclusion that "uncontaminated soil going to a CCDD or uncontaminated soil fill is an urban issue and not an agricultural area issue" (Exh. 58 at 2), and the further conclusion that chloride, sulfate, total dissolved solids, fluorides, nitrates and perchlorate are not "appropriate when you're talking about clean construction demolition debris" (Tr. 6 at 73). Mr. Huff has provided no real evidence that these contaminants may not be potentially present anywhere in the state where construction or demolition takes place and where various materials and products are produced, manufactured, or used. Even if the impacts to groundwater are on taste, odor or scale, they can preclude or threaten preclusion of a use.

2. Mr. Huff's testimony states the Board should not apply the non-degradation standard at 35 Ill. Adm. Code 620.301(a) to off-site groundwater contamination from fill operations. Instead, Mr. Huff proposes that corrective action for off-site contamination should achieve the numerical standard in Section 620.410, or, in the alternative, the exposure route should be eliminated with a groundwater use prohibition and that no mitigation should be required to protect or preserve uses of the resource. Pre-Filed Testimony of James E. Huff, P.E., Exh. 58 at 5; *see also* Proposed Section 1100.755(d).

Illinois EPA Response: The Agency already has responded to proposals for the use of groundwater use prohibitions as alternatives to mitigation of the effects of groundwater contamination. *See* Pre-Filed Testimony of the Illinois Environmental Protection Agency, Exh. 63 at 21 - 22; Illinois EPA Response at Question II(B)(2) above. As discussed in Section I above, the legislature has expressed the policy of protection and preservation of groundwater resources. First and foremost, this means prevention of groundwater contamination. The principle of non-degradation as set forth by the Board in Part 620 is an integral part of this policy and should not be abandoned for fill operations. Section 620.301, 620.401.

The Agency recognizes the Board requires more than a statistical increase above the background concentration of a contaminant to demonstrate a violation of the non-degradation provisions. However, the Board also has declined to adopt a policy that would allow pollution up to the numerical standard. "In the Matter of: Groundwater Quality Standards (35 Ill. Adm. Code 620)," PCB R1989-014(B), Final Order at 15 – 16 (November 7, 1991). Section 620.301(a) states:

a) No person shall cause, threaten or allow the release of any contaminant to a resource groundwater such that:

1) Treatment or additional treatment is necessary to continue an existing use or to assure a potential use of such groundwater; or

2) An existing or potential use of such groundwater is precluded

In the context of the Agency's proposal, the Agency interprets the nondegradation provisions to mean that, if off-site groundwater contamination impairs, precludes, or threatens to impair or preclude a use or potential use of a resource groundwater, even if corrective action lowers the contaminant concentration below the applicable numerical groundwater quality standard, the impairment, preclusion, or threat of impairment or preclusion of a use or potential use must be addressed as part of a corrective action.

3. Mr. Huff's pre-filed testimony contains several remarks about the maximum allowable concentrations ("MACs") of chemical constituents in uncontaminated soils and urges the Board to consider codification of the CCDD MAC concentrations. Mr. Huff also expresses concerns about the use of TACO background values for several constituents on the MAC Table. Pre-Filed Testimony of James E. Huff, P.E., Exh. 58 at 9 – 10.

Illinois EPA Response: The Agency continues to disagree with such an action. The Agency has been completely transparent about the methodology it proposed to establish the MACs and why it is better to rely on the methodology rather than codify the MAC Table in Part 1100. *See* Illinois Environmental Protection Agency's Statement of Reasons at 17 – 28; Illinois Environmental Protection Agency's Pre-First Notice Comments, PC # 9 at 5 – 10, 21 – 26;

Illinois Environmental Protection Agency's First Notice Comments, PC 39 at 14 – 17. The MAC methodology is entirely consistent with the Act. Section 3.160(c) of the Act directs the Agency to establish the maximum concentration of contaminants allowed in uncontaminated soil that will not pose a threat to human health and safety and the environment. The methodology in Section 1100.605 of the rule provides a logical and detailed narrative framework to satisfy this mandate.

Although the Act may allow some latitude in establishing MACs, Section 3.160(c) provides direct instructions for the derivation of MACs for carcinogenic contaminants. This section references the use of TACO remediation objectives and TACO background. The Agency has generalized this guidance and applied it to all TACO contaminants regardless of their potential to cause cancer. Further, as a practical matter, there was no acceptable basis other than TACO on which to proceed. TACO provides objectives for three receptors (residential, industrial/commercial, and construction worker) and three pathways of exposure (ingestion, inhalation, and migration to groundwater). The lowest of these options was selected to become the contaminant concentration that is protective of public health and safety. This lowest value represents the mandated 1-in-a-1,000,000 cancer risk level or the 100% likelihood of a non-cancer impact level for the most susceptible receptor. It is the same value TACO would assign to a cleanup if all receptors and pathways were considered and no use restrictions were placed on the property. This is the value at which no threat to human health or safety will be created – as required by Section 3.160(c) of the Act. As explained in sources cited above, these values may not be used as generally applicable standards for uncontaminated soil because they are not protective of environmental receptors and they present degradation issues.

Section 1100.605 of the rule accomplishes the goal of identifying the lowest TACO remediation objective for each contaminant. Because of the several procedural alternatives

intrinsic to TACO, a familiarity with the TACO rules is useful in applying the methodology, but it is not essential. If worked through carefully with the referenced materials at hand, the Section 1100.605 procedures combined with the TACO references produce only one result. The process is straight forward and reproducible. It is as binding on the Agency as the regulated community. There is no need to codify the resulting concentrations. If a consultant has calculated a different result than that published by the Agency in the MAC Table, the consultant should contact the Agency so the discrepancy can be worked out.

Mr. Huff also expressed concerns over background concentrations of inorganic constituents being established at the median of statewide concentrations. He has indicated a special concern for iron, manganese, chromium and arsenic. Iron, manganese and chromium are discussed elsewhere in this document, and the MAC for arsenic, a carcinogen, is strictly limited by Section 3.160(c)(1) of the Act. To avoid a myriad of site-specific standards and to maintain consistency in a statewide rule of general applicability, the Agency used the promulgated TACO background concentrations where background values were called for. The Agency acknowledges some limitations in the background database used in TACO and has disclosed these limits during prior Board hearings.

During the initial TACO hearings before the Board, the Agency testified that the database assembled in the Agency's *A Summary of Selected Background Conditions for Inorganics in Soil* (IEPA/ENV/94-61, August 1994) technical report was a collection of sample results submitted for various Bureau of Land ("BOL") projects that reported to represent background for these projects. This database in no way represents a scientifically designed study of the state-wide background occurrence of inorganics because: (1) there are areas of the state that are grossly overrepresented while in other areas there are counties that have as few as one "background"

sample value; (2) there were no consistent sampling and analysis methods applied; (3) there is an unknown level of quality assurance/quality control applied to the BOL projects included in the database; and (4) no statistical evaluation is appropriate for such a database. For these reasons, the Agency testified, and the Board concurred, that the only statistic reasonably representative of a state-wide summary value would be the median concentration.

The Agency hastens to point out that, while Mr. Huff's statement is technically correct that, theoretically, fifty percent of all results will exceed their corresponding background value when the median is used, it is very likely the median values are biased high because of the over-representation of urban sample locations in the database. Median values from a well-designed scientific study of background concentrations would very likely be lower than those determined in the Agency report and promulgated in TACO.

4. Both Mr. Hall and Mr. Quinn testified about their fears of fill operations being held liable for the groundwater contamination of others if groundwater monitoring is required. Testimony of Bret Hall, Tr. 6 at 176 – 177; Testimony of Josh Quinn, Tr. 6 at 181.

Illinois EPA Response: Mr. Hall and Mr. Quinn did not provide a scientific basis for their concerns about being held liable for the groundwater contamination of others despite a provision in the proposed Section 1100.750 allowing fill site owner/operators to demonstrate that contamination identified by the monitoring system is not from the facility. The Agency does not agree with their opinions.

It is assumed that Mr. Hall and Mr. Quinn are concerned about contaminated groundwater flowing radially (360°) from various areas into the fill site in response to a cone of

depression created from a well or sump dewatering the quarry. It is true that the withdrawal of groundwater by a well causes a lowering of water levels in the water table around the well. From a three-dimensional perspective, the pattern of drawdown around a single pumping well resembles a cone, with the greatest drawdown adjacent to the pumping well. The water table drawdown area affected by the pumping well, therefore, is called the ***cone of depression*** or, in map view, a lateral area of influence (LAI). (See Figure 1 below)

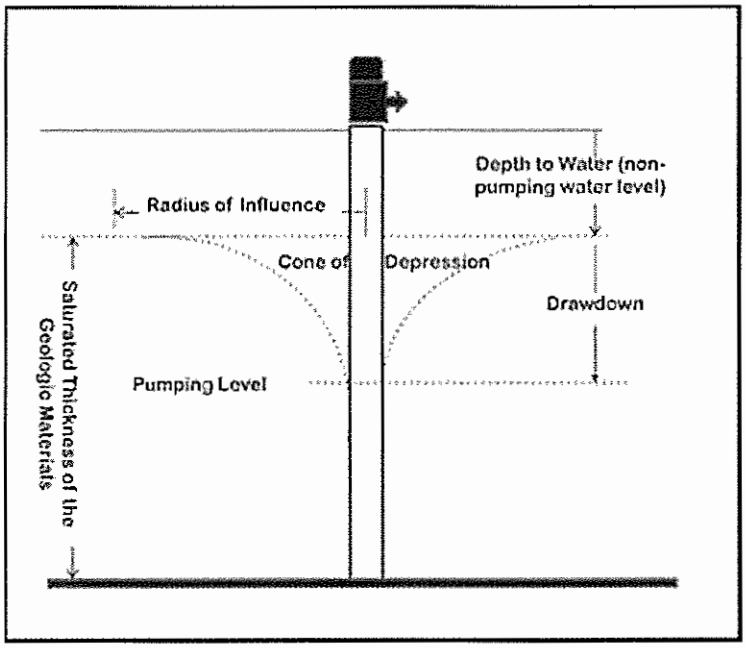


Figure 1. Conceptual cone of depression caused by a pumping well

However, in reality, this cone of depression is superimposed onto a pre-existing regional groundwater flow system and a zone of capture (ZOC) will be created, as shown in Figure 2 below. The vertical profile at the top of Figure 2 illustrates that groundwater is flowing from up-gradient on the right to down-gradient on the left. Further, the plan view of the ZOC at the

bottom of Figure 2 shows that the conceptual radial 360° flow system of the cone of depression is actually an elliptical shaped ZOC. The regional gradient limits the flow of groundwater contributing to the dewatering well from down-gradient and from the north and south (assuming that north is at the top of the page in the plan view). Therefore, the largest volume of water being pulled into the ZOC is primarily coming from the up-gradient end of the ZOC and not from all directions or 360°. This limits the amount of variability in the background groundwater quality coming into the fill site.

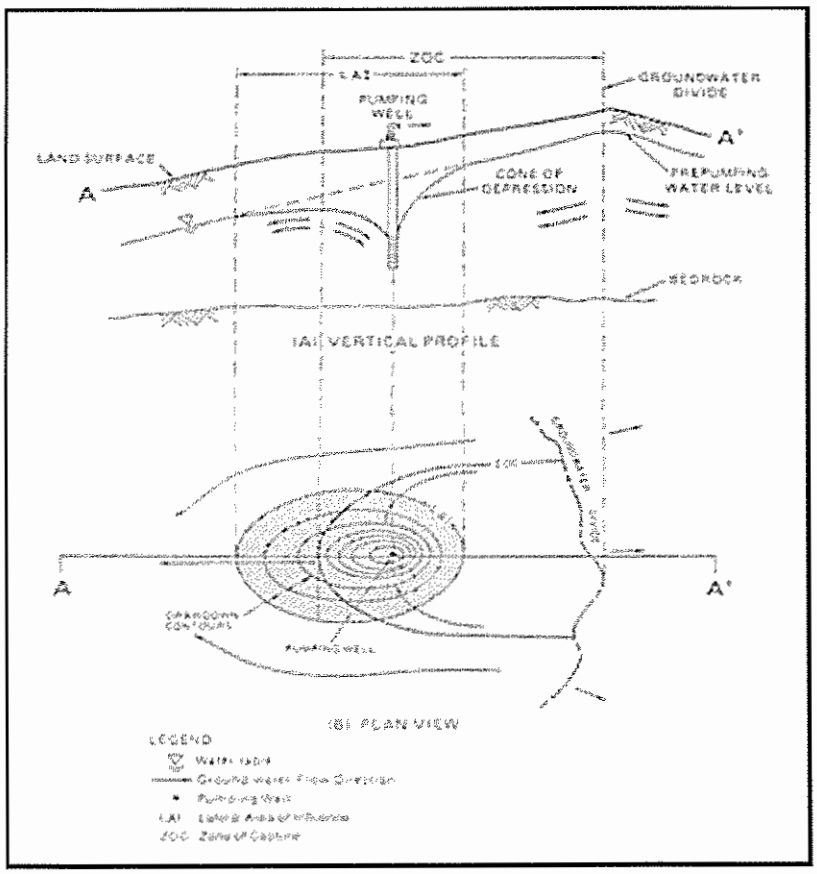


Figure 2. Conceptual cone of depression,

lateral area of influence (LAI)

and zone of capture (ZOC)

The Agency's proposed groundwater monitoring requirements are not effective until the owner or operator of the fill site turns off the dewatering pumps. Again, assuming the well in Figure 2 is a dewatering well at a fill site and pumping in the well has ceased, background groundwater will be moving into the fill site (from up-gradient on the right) and exiting the fill site (down gradient on the left) via the regional groundwater flow system along cross sectional line A' to A. At that time, the owner/operator of the fill site would be required to install monitoring wells, determine flow direction, and determine if the site is contributing to any groundwater contamination that is detected in down-gradient monitoring wells. Thus, based on the foregoing reasons, pre- and post-dewatering background groundwater quality should not be substantially different in the up-gradient monitoring well and down-gradient point of compliance monitoring well(s). Most importantly, the groundwater quality impacts attributable to the fill unit should be discernible using a statistically-based groundwater monitoring program from the "Statistical Analysis of Groundwater Data at RCRA Facilities—Unified Guidance (2009)" proposed for incorporation by reference.

STATE OF ILLINOIS)
)
COUNTY OF SANGAMON)

PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S POST-HEARING COMMENTS upon the persons to whom they are directed, by placing a copy of each in an envelope addressed to:

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ATTACHED SERVICE LIST
(First Class Mail)

and mailing them from Springfield, Illinois on August 1, 2013, with sufficient postage affixed as indicated above.

Stephanie Flowers

SUBSCRIBED AND SWORN TO BEFORE ME

This 1st day of August, 2013.

Notary Public

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Michael J McCabe
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My Commission Expires 9/29/2016

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