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STATE OF MONTANA
Case Number: DA 22-0406

DA 22-0406

IN THE SUPREME COURT OF THE STATE OF MONTANA

2024 MT 36

MONTANA TROUT UNLIMITED, MONTANA ENVIRONMENTAL INFORMATION CENTER, TROUT UNLIMITED, EARTHWORKS, and AMERICAN RIVERS,

Plaintiffs and Appellees,

v.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY, and TINTINA MONTANA, INC.,

Defendants and Appellants,

and

STATE OF MONTANA, by and through THE OFFICE OF THE ATTORNEY GENERAL, MEAGHER COUNTY, and BROADWATER COUNTY,

Defendants, Intervenors, and Appellants.

APPEAL FROM: District Court of the Fourteenth Judicial District,
In and For the County of Meagher, Cause No. DV-20-10
Honorable Katherine M. Bidegaray, Presiding Judge

COUNSEL OF RECORD:

For Appellant Tintina Montana, Inc.:

Dale Schowengerdt (argued), Landmark Law PLLC, Helena, Montana

Neil G. Westesen, Victoria A. Marquis, Crowley Fleck PLLP, Helena, Montana

William W. Mercer, Matthew H. Dolphay, Holland & Hart LLP, Billings, Montana

For Appellant Montana Department of Environmental Quality:

Jeremiah Langston (argued), Department of Environmental Quality, Helena, Montana

For Appellant Broadwater County:

Cory Swanson, Broadwater County Attorney, Townsend, Montana

For Appellant Meagher County:

Burt N. Hurwitz (argued), Meagher County Attorney, White Sulphur Springs, Montana

For Appellees:

Jenny Kay Harbine (argued), Benjamin J. Scrimshaw, Earthjustice, Bozeman, Montana

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Argued: June 21, 2023
Submitted: June 27, 2023
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Filed:

Clerk

Justice Beth Baker delivered the Opinion of the Court.

¶1 The Montana Department of Environmental Quality and Tintina Montana Incorporated appeal the Fourteenth Judicial District Court's order revoking the permit that DEQ granted Tintina to construct and operate the Black Butte Copper Mine. The District Court revoked the permit after concluding that DEQ failed to adhere to two statutory schemes governing the state permitting process—Montana's Metal Mine Reclamation Act (MMRA) and the Montana Environmental Policy Act (MEPA). Upon careful review of DEQ's administrative record, however, and applying the appropriate standards of review, we conclude that the agency demonstrated compliance with both laws. We accordingly reverse the District Court's order and reinstate Tintina's permit. We address three issues:

1. *Did DEQ satisfy MMRA and MEPA when it approved Tintina's cemented tailings facility?*

2. *Did DEQ satisfy MEPA by rationally evaluating the environmental impact of the mine's total nitrogen discharges into Sheep Creek?*

3. *Did DEQ satisfy MEPA when it considered and dismissed alternatives to the proposed action?*

FACTUAL AND PROCEDURAL BACKGROUND

¶2 This case concerns the legality of a permit for a proposed copper mine along a key tributary of the Smith River. The Smith River is an undisputed Montana treasure. It rises in southern Meagher County and flows northwest between the Big Belt and Little Belt Mountains, eventually joining the Missouri River outside of Great Falls. A 59-mile segment of the Smith, with only one public put-in and take-out, provides anglers and other recreationists with an iconic and coveted float trip. Given the Smith River's popularity and the Legislature's desire to protect its natural scenic beauty and conserve fish and wildlife,

the river is subject to a recreational permitting program—the only kind in the State. *See* § 23-2-407, MCA. Each year, thousands of people apply for a permit to float the Smith; the State awards about 1,000 permits each year.

¶3 In 2010, Tintina acquired mineral rights via lease agreements to nearly 2,000 acres of private land bordering Sheep Creek, nineteen miles upstream from where Sheep Creek feeds into the Smith. Tintina conducted licensed exploration of the acreage for five years, located high-grade copper deposits, and, in December 2015, submitted a mine operating permit application to DEQ per the MMRA. *See* § 82-4-335, MCA. Tintina proposed to construct, operate, and reclaim the mine—named the Black Butte Copper Mine—over the course of nineteen years (two years for construction, thirteen years for active mining, and four years for reclamation and closure). Throughout the administrative process and subsequent appeals, Tintina has emphasized the importance of mining copper to the manufacturing of wind turbines and the shift to renewable energy technology. Intervenors Meagher and Broadwater Counties emphasize the economic promise of the mine for their communities in terms of increased employment and tax-base, along with the counties' interest in protecting the Smith River.

¶4 The proposed mine would be underground, accessing copper deposits via a 17-by-17-foot-diameter surface portal. Nearly 19,000 feet of underground access ramp and drifts would be developed, but Tintina anticipates a surface disruption of only 300 of the 2,000 acres. Tintina estimates that its operations would extract 15.3 million tons of

material—14.5 million tons of copper-enriched rock, also known as copper ore, and 0.8 million tons of waste rock.

¶5 Tintina plans to process the copper ore into a copper concentrate on site, use trucks to ship the concentrate for sale, and store on site an estimated 12.9 million tons of tailings (material left over after processing ore). Proposed surface facilities include a processing plant, Cemented Tailings Facility (CTF), water treatment plant, various processing and storage ponds, wet-well and pipeline, buried drainpipes, roads, stockpiles, powerline, ditches, roads, parking, and fencing. Just under half, (45%) of the tailings would be mixed with cement and other binder and deposited underground to backfill the mined-out voids. The rest (55%) would be mixed with a lower concentration of cement and other binder and placed in the above-ground CTF. Of Tintina's entire proposed design, the only challenged aspects involve the CTF and the handling of groundwater pumped from underground shafts and voids. The CTF and groundwater pumping system are described in further detail in our discussion.

¶6 Tintina engaged in nearly five years of review with DEQ pursuant to various statutes. This process resulted in an administrative record of nearly 90,000 pages. Three times, DEQ found and detailed numerous substantive deficiencies in Tintina's application. Tintina submitted extensive revisions each time before DEQ deemed the application minimally complete in 2017. DEQ then began environmental review under MEPA. DEQ held an initial scoping public comment period in the fall of 2017, with four public meetings (one each in Great Falls, White Sulphur Springs, Helena, and Livingston). DEQ assembled

a team of seventeen internal experts and forty-two outside consultants, including hydrologists, geologists, geochemists, engineers, and biologists. This team drafted an environmental impact statement (EIS), which was issued on March 11, 2019. DEQ then opened a public comment period on the Draft EIS through May 2019. This comment period included three in-person meetings (one each in Great Falls, Livingston, and White Sulphur Springs), two online meetings, and mail and e-mail comments. The Final EIS, issued in February 2020, compiled and responded to public comments.

¶7 On April 9, 2020, DEQ issued its Record of Decision on Tintina's application for a mine operating permit.[1] Out of three alternatives identified during environmental review (not permitting the mine, permitting the mine without modification, or permitting the mine with modification), DEQ opted to permit the mine with modification.[2] DEQ explained that, in coming to its decision, it considered all relevant scientific information—as well as scientific uncertainty and risk—public concerns and opposing viewpoints, and the various applicable state laws. DEQ recognized the proximity of the proposed mine to the Smith River and "the importance to the State of the Smith River, in terms of ecological,

[1] In the same record of decision, DEQ issued a Montana Pollutant Discharge Elimination System (MPDES) permit under the Montana Water Quality Act. Appellees did not challenge the MPDES permit, and it is not at issue. MTU and other conservation groups did, however, challenge the Montana Department of Natural Resources and Conservation's determination regarding Tintina's application for a beneficial use permit under the Montana Water Use Act, Title 85, chapter 2, MCA. That challenge is pending before this Court in a separate appeal, S. Ct. No. DA 23-0268.

[2] The modification added a requirement that Tintina backfill additional mineralized mined-out voids with cemented paste tailings.

recreational, and economic values," but asserted that no potential environmental impacts on the Smith River were identified.

¶8 Montana Trout Unlimited and various other conservation organizations (collectively MTU) sought judicial review of DEQ's decision in the District Court and moved for summary judgment, arguing that the agency's issuance of the permit violated MMRA and MEPA. DEQ, Tintina, and Meagher and Broadwater Counties filed cross-motions for summary judgment.[3] After hearing oral argument, the District Court granted summary judgment to MTU on three alternative grounds: (1) DEQ did not rationally consider and ensure the safety and stability of the CTF, and therefore violated MMRA and MEPA when it issued the permit; (2) DEQ failed to rationally evaluate the environmental impact of the mine's nitrogen discharges to Sheep Creek and therefore violated MEPA; and (3) DEQ failed to reasonably analyze alternatives to the proposed project, also in violation of MEPA.

¶9 On June 21, 2023, this Court heard oral argument on DEQ's and Tintina's appeals of the District Court's order and took the matter under advisement.

STANDARD OF REVIEW

¶10 Summary judgment is appropriate where there is no genuine dispute of material fact and the movant is entitled to judgment as a matter of law. M. R. Civ. P. 56(c)(3). We review summary judgment rulings de novo, applying the same criteria the district court

[3] The State of Montana also opposed MTU's motion for summary judgment but ceased its involvement after the District Court avoided the constitutional issue.

applied. *Clark Fork. v. Mont. Dept. of Envtl. Quality*, 2008 MT 407, ¶ 19, 347 Mont. 197, 197 P.3d 482 [hereinafter *Clark Fork I*].

¶11 A court carefully reviews an agency's decision to determine whether the decision was "arbitrary, capricious, unlawful, or not supported by substantial evidence." *Clark Fork I*, ¶ 21.[4] "Substantial evidence is evidence that a reasonable mind might accept as adequate to support a conclusion. It consists of more than a mere scintilla of evidence but may be less than a preponderance." *Mont. State Univ.-Northern v. Bachmeier*, 2021 MT 26, ¶ 30, 403 Mont. 136, 480 P.3d 233 (citation omitted). An agency must show that it examined the relevant data and must articulate a satisfactory explanation for its action, "including a rational connection between the facts found and the choice made." *Clark Fork I*, ¶ 47. A court does not merely defer to an agency without close review of the record and satisfaction that the agency made a reasoned decision without clear error of judgment. *Clark Fork I*, ¶ 21 (citation omitted).

¶12 Nevertheless, "the ultimate standard of review is a narrow one." *Clark Fork I*, ¶ 27. We recognize that the Legislature has entrusted certain scientific and technical decisions to expert agencies, and our review of such decisions raises constitutional separation-of-powers considerations. *MEIC*, ¶ 20. "To balance these constitutional

[4] Montana's Administrative Procedure Act governs judicial review of "contested cases." Title 2, chapter 4, part 7, MCA. MAPA defines "contested case" as "a proceeding before an agency in which a determination of legal rights, duties, or privileges of a party is required by law to be made after an opportunity for hearing. The term includes but is not restricted to ratemaking, price fixing, and licensing." Section 2-4-102(4), MCA. The underlying administrative proceeding in this case was not a contested case for purposes of MAPA; our review thus is performed under the standards discussed here. *See Mont. Envtl. Info. Ctr. v. Mont. Dep't of Envtl. Quality*, 2019 MT 213, ¶ 19, 397 Mont. 161, 451 P.3d 493 [hereinafter *MEIC*].

concepts and to ensure that agency decision-making is scientifically-driven and well-reasoned, this Court affords 'great deference' to agency decisions implicating substantial agency expertise." *MEIC*, ¶ 20 (citation omitted). In reviewing the agency's decision, "[t]he Court's focus is on the administrative decision-making process rather than the decision itself." *Water for Flathead's Future, Inc. v. Mont. Dep't of Envtl. Quality*, 2023 MT 86, ¶ 11, 412 Mont. 258, 530 P.3d 790 (quoting *Park Cty. Envtl. Council v. Mont. Dep't of Envtl. Quality*, 2020 MT 303, ¶ 18, 402 Mont. 168, 477 P.3d 288 [hereinafter *Park Cty. Envtl. Council*]. Courts should not substitute their own judgment for that of the agency by asking whether the agency's decision was the "correct" one scientifically, morally, or politically. Courts instead interpret the law and determine if the agency made its decision with sufficient information or if "the decision was so at odds with the information gathered that it could be characterized as arbitrary or the product of caprice." *Clark Fork I*, ¶ 27. Importantly, "[a]n agency decision is not arbitrary or capricious merely because the record contains inconsistent evidence or evidence which might support a different result." *Clark Fork. v. Mont. Dep't of Natural Res. & Conservation*, 2021 MT 44, ¶ 34, 403 Mont. 225, 481 P.3d 198 [hereinafter *Clark Fork II*] (quotations omitted). A decision is arbitrary and capricious only if "apparently random, unreasonable[,] or seemingly unmotivated based on the existing record." *Water for Flathead's Future*, ¶ 12 (citations and quotations omitted).

DISCUSSION

¶13 *Issue One: Did DEQ satisfy MMRA and MEPA requirements when it approved the proposed cemented tailings facility?*

MMRA

¶14 MMRA sets forth a series of substantive requirements for the permitting of metal mines in Montana. Title 82, chapter 4, part 3. In passing MMRA, the Legislature declared that mining "is a basic and essential activity making an important contribution to the economy of the state and the nation." Section 82-4-301(3), MCA. At the same time, the Legislature recognized that mining necessarily creates disturbances and produces waste and that proper reclamation of mined land "is necessary to prevent undesirable land and surface water conditions detrimental to the general welfare, health, safety, ecology, and property rights of the citizens of the state." Section 82-4-301(3), MCA. The Legislature found that MMRA balanced the need to mine with the need for subsequent beneficial use of land. It further expressed that its intent in passing MMRA was to "provide adequate remedies for the protection of the environmental life support system from degradation and provide adequate remedies to prevent unreasonable depletion and degradation of natural resources." Section 82-4-301(2)(a), MCA. In sum, MMRA's purposes include allowing mining as an economically beneficial and practical activity; mitigating or preventing harmful offsite environmental impacts; and providing for reclamation. Section 82-4-302, MCA.

¶15 In 2015, the Legislature revised MMRA to establish standards for tailings storage facilities.[5] 2015 Mont. Laws ch. 399. The standards make clear that tailings storage

[5] A tailings storage facility is a "facility that temporarily or permanently stores tailings . . .," excluding a facility that "stores 50 acre-feet or less of free water or process solution." Section 82-4-303(34), MCA. DEQ initially determined that Tintina's proposed CTF met the exception (storing less than 50-acre feet of water or process solution) and thus did not need to meet

facilities are to be "designed, operated, monitored, and closed in a manner that: meets state-of-practice engineering design standards; uses applicable, appropriate, and current technologies and techniques as are practicable given site-specific conditions and concerns; and provides protection of human health and the environment . . . ." Section 82-4-301(2)(b), MCA. The Legislature declined to issue prescriptive regulations of tailings storage facilities, opting instead to allow "for adaptive management using evolving best engineering practices based on the recommendations of qualified, experienced engineers." Section 82-4-301(2)(c), MCA; *see also* § 82-4-301(3), MCA ("Mining . . . take[s] place in diverse areas where geological, topographical, climatic, biological, and sociological conditions are significantly different, and the specifications for . . . tailings storage facilities must vary accordingly.").

¶16 Under the 2015 revisions, an applicant for a mine operating permit must include in its application to DEQ:

> [A] plan detailing the design, operation, and monitoring of impounding structures, including but not limited to tailings impoundments and water reservoirs, sufficient to ensure that the structures are safe and stable. **For a tailings storage facility, this requirement is met by submission of a design document pursuant to 82-4-376, a panel report pursuant to 82-4-377, and a tailings operation, maintenance, and surveillance manual pursuant to 82-4-379 prior to issuance of a draft permit.**

MMRA's substantive standards for tailings storage facilities. The District Court disagreed, concluding that the CTF did need to meet MMRA's standards. Neither Tintina nor DEQ takes issue on appeal with application of the statute. Tintina's initial application to DEQ in 2015 in fact acknowledged the statutory amendments and stated that "the CTF will be designed and constructed in compliance with all applicable requirement[s] for construction of tailings impoundments, including the newly enacted tailings additions to the mine reclamation laws (Senate Bill 409)."

Section 82-4-335(4)(l), MCA (emphasis added to 2015 additions). Each of the referenced statutes explains in detail the three requirements for a tailings storage facility to be considered a "safe and stable" structure: a design document containing thirty-one different descriptions and analyses (§ 82-4-376, MCA); review of the design document by an "independent review panel" (IRP) (§ 82-4-377, MCA); and a tailings operation, maintenance, and surveillance manual (TOMS manual) (§ 82-4-379, MCA).

MEPA

¶17 During its review and decision-making, DEQ also must comply with MEPA. Title 75, chapter 1, MCA. MEPA entails various statutory procedures and corresponding administrative rules to ensure environmental review by state agencies. Under MEPA, agencies must prepare an Environmental Impact Statement (EIS) for all projects "significantly affecting the quality of the human environment." Admin. R. M. 17.4.607 (1989); § 75-1-201(1)(b)(iv), MCA. The EIS describes the proposed action, the current environmental conditions in the affected area, and the action's potential impacts on the environment. Admin. R. M. 17.4.617(1), (3), (4) (1989). The EIS also analyzes and discusses reasonable alternatives (including a no-action alternative), mitigation, stipulations, tradeoffs among reasonable alternatives, and the agency's preferred course of action. Admin. R. M 17.4.617(5) - (9) (1989). The public has opportunity to comment on the scope of the review process and on the draft EIS once issued; the final EIS must respond to substantive comments received. Admin. R. M. 17.4.615, 17.4.619 (1989). MEPA is meant to "encourage productive and enjoyable harmony between humans and their

environment"; "protect the right to use and enjoy private property free of undue government regulation"; and "promote efforts that will prevent, mitigate, or eliminate damage to the environment and biosphere and stimulate the health and welfare of humans." Section 75-1-102(2), MCA.

¶18 In reviewing for MEPA compliance, courts ask whether an agency took a "hard look" at the environmental impacts of a given project or proposal. *Mont. Wildlife Fed'n v. Mont. Bd. of Oil & Gas Conservation*, 2012 MT 128, ¶ 43, 365 Mont. 232, 280 P.3d 877 (citation omitted). "[The Court] does not take a hard look itself but requires that the agency does so. The Court focuses on the validity and appropriateness of the administrative decision-making process without intense scrutiny of the decision itself." *Mont. Wildlife Fed'n*, ¶ 43 (quoting *Clark Fork I*, ¶ 47).

Issue Preservation

¶19 We address initially the contentions of DEQ and Tintina that MTU failed to preserve during the administrative process its claims regarding tailings flowability and liquefaction, and that this Court accordingly may not review MTU's challenges on those grounds. The District Court concluded that claims brought under MMRA do not need to meet MEPA exhaustion requirements and that, regardless, MTU preserved each issue. MTU maintains that the court correctly held that MEPA exhaustion is not required for claims brought under MMRA or, alternatively, that all issues were adequately raised during the public comment period.

¶20 In a challenge to a DEQ decision or to the adequacy of its environmental review, MEPA prohibits courts from considering "any information, including but not limited to an issue, comment, argument, proposed alternative, analysis, or evidence, that was not first presented to the agency for the agency's consideration prior to the agency's decision or within the time allowed for comments to be submitted." Section 75-1-201(6)(a)(iii), MCA. We agree with MTU that it minimally preserved issues of flowability and liquefaction during the administrative process and thus do not reach the issue whether MEPA exhaustion is required for claims brought directly under MMRA.

¶21 MTU points to various comments on the Draft EIS and DEQ responses in the Final EIS to support its preservation of the flowability issue. For example, one commenter stated, "Consideration should be given to adding 4% cement binder to surface-disposed tailings to allow them to set up more quickly." DEQ responded, "Increasing the cement and binder content in the paste tailings in either location would not provide additional environmental benefits, and if too much cement and binder were added, it would not be possible to pump the tailings through a pipeline." In response to a different comment, DEQ stated:

> The small quantity of cement proposed to be added to the paste tailings is not intended to delay or prevent ARD [Acid Rock Drainage] formation; rather, it is to provide structural strength and to change the physical properties of the tailings to a stable, non-flowable material with low hydraulic conductivities . . . . These sections also note that either cement addition rate would result in a tailings deposit sufficiently stable to maintain structural integrity in the event of an embankment failure (i.e., the tailings deposit would remain in place even if the dam did not). Paste tailings do not present the risk of catastrophic failure that is associated with conventional saturated tailings impoundments.

Even though these statements arose in the context of oxidation and acid formation of the tailings, their substance indicates that the public was concerned about, and DEQ addressed, the structural integrity of the surface tailings.

¶22 Similarly, the issue of liquefaction was preserved in at least the following comment:

> In particular, the Draft EIS arbitrarily ignores the potential that the CTF containment system will fail. The Draft EIS appears to acknowledge that a 'release of tailings' is possible 'in response to impoundment failure or seismic events,' Draft EIS at 3.5-24, but the Draft EIS makes no attempt to quantify the risk of such failure, characterize the environmental consequences of tailings release, or provide 'reasonable assurance' that tailings CTF impoundment failure 'will not occur.' ARM 17.4.608(1)(b).

DEQ's response to another comment concerned about the stability of the tailings stated that the dewatering process "causes the material to have a lower permeability, which . . . precludes liquefaction during earthquakes . . . ." Comments, despite not necessarily using the word "liquefaction," provided sufficient clarity such that DEQ understood the issue and used its expertise to resolve the claim, explicitly addressing liquefaction in its responses. *Cf. Vote Solar v. Mont. Dep't of Pub. Serv. Regulation*, 2020 MT 213A, ¶ 48, 401 Mont. 85, 473 P.3d 963 (describing the requirement under MAPA to raise certain questions before an agency with "enough clarity such that the decision maker understands the issues raised" before raising them in judicial review). We accordingly review MTU's claims on the merits.

Non-Flowable Mass

¶23 The District Court concluded that DEQ violated MMRA and MEPA "by failing to evaluate or respond meaningfully to record evidence that the proposed design for Tintina's

tailings facility does not 'ensure' that this impounding structure will remain 'safe and stable,' § 82-4-335(5)(l), MCA, and may not effectively contain toxic mine waste." The court relied on evidence that Tintina expects, in the court's words, "new layers of 2 percent cement-paste tailings to take 28 days to set fully at the facility." The court reasoned that Tintina's plan to layer tailings, on average, every seven to fifteen days, would prevent the tailings from forming a stable, non-flowable mass. The court also stated that the record showed that reducing binder content of the surface tailings "significantly increases their drying time, making it a near certainty that lower layers with just 0.5 percent binder content will not have set before fresh tailings are deposited on them."

¶24 DEQ and Tintina argue that the court "replaced DEQ's extensive review and expertise with its own misinterpretations of inapposite record evidence." They contend that the court: confused the difference between ultra-thickened cemented paste tailings setting into a non-flowable mass and those same tailings achieving "final set"; failed to consider evidence supporting the stability of ultra-thickened tailings notwithstanding binder content; ignored the embankment, high-density polyethylene (HDPE) liners, and pump system as additional safety mechanisms of the CTF; and discounted their intentional plans for operational flexibility and ongoing monitoring given anticipated varying weather conditions and tailings characteristics. MTU responds that the court correctly enforced Montana law when it determined that DEQ arbitrarily and unlawfully issued a mining permit without record assurance—beyond mere statements—that the tailings will be non-flowable.

¶25 Careful review of the reports and rationales leading to the proposed and permitted CTF leads us to conclude, as explained below, that the record contains substantial evidence to support DEQ's determination that the surface tailings would form a stable, non-flowable mass.

Dewatered and Cemented Paste Tailings

¶26 To manage tailings at the Black Butte Copper Mine, Tintina proposes to process and store them on site in the CTF. Processing the extracted ore and separating out the copper concentrate would produce a tailings slurry. The slurry first would be dewatered "using a separate high-rate thickener and flocculent" to achieve an initial 60% density. The tailings would be further dewatered using a pressure filter, resulting in an estimated 70-85% density. The result would be an "ultra-thickened" paste. Tintina's proposal relied on research that ultra-thickened paste tailings—as opposed to slurry tailings (25-60% solids) and thickened tailings (57-67% solids) which can flow with gravity—"can flow with the application of pressure, much like cake-frosting which only flows out of a tube onto a cake under pressure." Filtered tailings (>80% solids), conversely, "are too dry to flow, even under pumping pressure, and must be transported mechanically with trucks or belts."

¶27 About 45% of the ultra-thickened paste tailings would be mixed with 4% binder (a combination of cement and slag) and pumped underground to fill mined-out voids. MTU does not take issue with Tintina and DEQ's proposal for these backfill tailings. The remaining ultra-thickened paste tailings (about 55%) would be mixed with 0.5-2% binder (a combination of cement, slag, and fly ash) and pumped to the above-ground CTF for

deposition. Tintina proposes to deposit the cemented paste tailings into the CTF in thin successive layers, also known as "thin lifts," on average every seven to fifteen days, but never longer than every thirty days. The layers would be deposited in a slope formation for proper drainage of rainfall; the thickness of the layers would depend on operational effectiveness, determined through ongoing monitoring and assessment. Tintina proposes to add cement to ultra-thickened paste tailings to "reduce potential flow, reactive surface area, and dust generation."

Knight Piésold Working Group

¶28 In coming to the above design for surface tailings storage, Tintina convened a working group of eighteen scientists and engineers from Tintina itself, the mining consulting firm Knight Piésold, and several other firms. The group identified and evaluated six feasible tailings storage methods and selected the most appropriate method for the specific project and location.[6] The group's work was based on site-specific meteorological, geotechnical, and hydrogeological studies completed or contracted by Knight Piésold. The studies were submitted as part of Tintina's application to DEQ. Each member of the group selected their first, second, and third choice of method, given the selection criteria. Selection criteria included effective and efficient tailings management and "minimizing potential environmental impacts including facility stability, environmental risk[,] and minimizing impacts to wetlands." In striving to meet these criteria, the group considered,

[6] The six possible methods identified were: conventional tailings slurry deposition; dry stack tailings; depyritized ultra-thickened sub-aqueous deposition; two-cell ultra-thickened depyritized and pyrite concentrate; paste tailings with 4% cement content; and paste tailings with 2% cement content.

among other factors, the ore body, tailings characterization—including "known rheological characteristic and geochemistry," waste rock characterization, site location, and cost.

¶29 After taking a weighted average of each member's selections, the group's clear first choice was to store the surface paste tailings with reduced (0.5-2%) cement content. The group identified that "all of the pros and cons identified for the 4 percent paste tailings alternative were also identified for the 2 percent alternative." The pros of both methods included: a deposit into the CTF that would be "sufficiently stable to maintain structural integrity in the event of an embankment failure"; reduced embankment costs; reduced dust generation; and reduced evaporative water losses. The cons of both options included that they would require a separate process water storage pond and that there was potential for oxidation on the surface between deposition of layers.[7] The group found that the only difference was that "the 2 percent alternative has a lower operating cost than does the 4 percent alternative while still providing sufficient structural integrity for the deposited cemented paste."

Ontario Cylinder Tests

¶30 One of the studies on which the group based its recommendations was experimental testing of tailings material performed by a laboratory in Ontario, Canada. In 2015, the lab received a limited quantity of solid materials drilled from the proposed mine site. The lab prepared samples using the sourced materials, adding water to achieve a range of solid content and varying ratios of cement, fly ash, and slag. The lab aimed to achieve two

[7] Oxidation is the alteration of rock by the addition or in the presence of oxygen. The oxidation issue is addressed below.

properties desirable to Knight Piésold in the hypothetical surface tailings: 1) a slump of 7-9 inches to ensure paste pumpability into the CTF; and 2) non-flowability once deposited. The lab and Knight Piésold sought the additional property of "unconfined compressive strength" in tests for backfill tailings, which would experience pressures underground. The lab explicitly did *not* seek unconfined compressive strength for the surface tailings because the material would be "fully contained and laterally supported in the depositional environment."

¶31 Twenty samples were cast as cylinders measuring 2-by-4 inches and 3-by-6 inches. Additional samples were cast as cones measuring 4-inch (top) by 8-inch (base) by 12-inch (height). Samples were initially cured at 70 degrees Fahrenheit and 100% relative humidity and, once demolded, tested for slump and unconfined compressive strength.[8] The lab conducted trial tests of samples with a range of solid content from 75% to 85% and measured "cone slump" with samples containing no binder (0%), 2% binder, and 4% binder. Experimenters stopped increasing the total solid content "[w]hen the mix became very stiff." The results demonstrated that increased cement content generally was accompanied by increased initial strength (lower slump). The results also demonstrated that increased total solid content was accompanied by increased initial strength. For example, tailings with a high total solid content (84%) and 0% binder slumped 0.39 inches in the cylinder sample and 3.35 inches in the cone sample, whereas tailings with lower total

[8] All samples were prepared and cured in accordance with the American Society for Testing and Materials's "Standard Practice for Making and Curing Concrete Test Specimens" and "Standard Test Method for Slump of Hydraulic Cement Concrete."

solid content (79%) and 4% binder slumped more (.59 inches in the cylinder sample and 8.1 inches in the cone sample). Thus, the results demonstrated that the desirable slump range was achievable with 0% binder and a high total solid content. The experimenters identified the following, among others, as significant conclusions:

1. The optimum [total solids content] for the 2% binder mix is 79.5% at a cone slump of 8.3 [inches].
2. The optimum [total solids content] for the 4% binder mix is 79% at a cone slump of 8.1 [inches].
3. The 2% binder mix does not achieve final set until approximately 28 days age.
4. The 4% binder mix achieves final set after approximately 96 hours (4 days).

¶32 Based on the testing results, a Senior Lead Engineer with the lab sent a memorandum to Tintina that recommended the Black Butte Copper Mine use a range of 0.5-2% binder for the surface tailings and an increased 4% binder for the underground back-fill tailings to "ensure adequate strength." The engineer advised:

> The cemented paste tailings placed in the surface Cemented Tailings Facility is spread in thin layers on the surface and is not required to achieve compressive strength for support. The addition of binder (0.5% - 2.0%, by weight) for cemented paste tailings is intended to ultimately change the pumpable paste into a dry, consolidated material.

The lab analyzed the differences between the humidity and temperatures of the underground tailings and surface tailings. The memo explained that a nine-inch slump paste consistency would be achieved by adding water in order to pump the cemented paste through the long, horizontal pipelines, which would avoid plugging of the pipelines. The lab concluded that the more cemented underground tailings would be less likely to discharge bleed water and more likely to evaporate water from the wet paste tailings'

surface. The memo advised that the surface tailings, which would be spread in thin layers above ground and contain a lower cement content, would be more likely to discharge bleed water and less likely to evaporate water from the paste's surface than the underground tailings. The lab anticipated bleed water to be 3-5% of the surface tailings' weight and to be "noticeable for a few days, until cemented paste tailings are consolidated."

Enviromin Report on Surface-Placed Cemented Paste Tailings

¶33 To come to its surface tailings proposal, Tintina also relied on a white paper report prepared by Enviromin, a Bozeman-based consulting firm specializing in geochemistry. The report addressed "Surface-Placed Cemented Paste Tailings," compiling case studies and research regarding the use of cemented and uncemented paste tailings. The report concluded that surface placement of cemented paste tailings was an innovative and logical application of two proven technologies: cemented paste tailings backfill and surface placement of paste tailings. The report stated that the dual approach reduced "the long-term risks associated with tailings dams (subaqueous tailings impoundments)" and lessened "potentially unfavorable environmental conditions observed in traditional tailings facilities, such as dust and water quality impacts."

¶34 The report stated that the use of surface paste tailings without binder was first patented in 1996 and that operational use first occurred in 2003. The report stated that "[s]ubsequent application of this technology has shown that it can be tailored to fit site-specific geotechnical and environmental requirements . . . ." The report shared research that although "seepage from surface-placed paste tailings is extremely unlikely,

because they have very low hydraulic conductivity by design, any potential seepage to groundwater could be mitigated with the use of clay or synthetic liners." Surface paste tailings *without binder* reduced costs, but a few problems persisted, including: "over-topping, erosion of paste within the facility (which increases pressure on dams), and potential for static liquefaction accompanied by static or seismic slope instability."

¶35 The Enviromin Report referenced more than 80 articles and studies, identifying five mines across the globe that placed uncemented paste tailings in surface facilities. A 2003 study about the Bulyanhulu Mine in Tanzania—which uses no binder—shared that the facility deposited lifts every five days to prevent oxidative weathering of exposed surfaces. The same study noted "that addition of the paste in thin lifts, with a maximum thickness of 30 cm, allowed for sufficient desiccation (drying) to provide required geotechnical stability." The Enviromin Report stated that, per numerous cited studies, the Bulyanhulu Mine "is generally considered a successful facility."

¶36 The Enviromin Report went on to analyze the use of cemented paste tailings. Although researched at the lab-scale for more than fifteen years, the cemented paste tailings method "has only been partially implemented at the facility scale at a single known facility." A 2016 study—one of several cited and described in the report—continued the research of a 2011 study that had examined placement of cemented paste tailings layers within layers of uncemented paste tailings. The new 2016 study examined the effect of adding a final cemented paste layer by applying seven wetting and drying cycles and conducting post-test examinations of the microstructure within the layers using destructive

sampling techniques. Results indicated "that drying of deeper layers of paste tailings appears to have been inhibited by addition of a final cemented-paste layer." The Enviromin Report relied on other studies in concluding that surface cemented paste tailings required less strength than backfill tailings; that binder proportion can be varied throughout operations to meet project needs; that binder selection and amount are site-specific; and that surface cemented paste tailings posed an extremely low-to-no risk of catastrophic failure. Noting a 2017 "United Nations call for zero-failure standards in tailings facility design," the report summarized, in part: "The utilization of cemented-paste tailings in a surface facility, while acknowledged as a very expensive approach, is the highest level of tailings safety management and goes well beyond the recommendations of the 2017 United Nations report." It concluded that "the integration of two well-studied technologies"—cemented-paste tailings *backfill* and surface-placed tailings (to include a cemented-paste binder)—in combination with other safeguards such as facility liners, "is a best-management practice that offers the greatest potential for a 'zero-failure' facility."

Engineered Embankment

¶37 Tintina proposes to locate the CTF against a hillside, bordered on three sides by natural topography. The fourth side would be an engineered embankment made from free draining rockfill, which is considered not susceptible to liquefaction and more stable than an embankment made from tailings. The embankment would be constructed on bedrock, which is not expected to deform, creep, or displace during an earthquake event. Tintina engineered the embankment, as required by MMRA, to withstand the "maximum credible

earthquake"; the 1-in-10,000-year earthquake event; the "maximum flood event"; and the 1-in-500 year, 24-hour flood event. *See* § 82-4-376(2)(i), -376(2)(cc), MCA. When analyzing for various hazards (foundation and slope instability, overtopping, and internal erosion and piping), the probability of failure of the embankment was designated as either "not credible" or "very low." The Dam Breach Risk Assessment prepared by Knight Piésold clarifies that the CTF embankment is not designed as a water-retaining impoundment and that breach of the embankment and a tearing of the liner system is a "very unlikely event." In such an unlikely event, Knight Piésold expected that the cemented paste tailings, considered to be a non-flowable mass, "may slump in place, but will not flow out to the downstream receiving environment."

Liner and Pump System

¶38 Lining the bottom of the CTF would be two HDPE liners with geonet and geotextile material above, between, and below them. To collect water from rain and flooding and any bleed water from the cemented paste tailings, a rock drain would be placed above the liners, another drain between the two liners (in the improbable event water escapes the first liner), and a final drain below both liners. Three high-capacity pumps would remove collected water to a separate facility for treatment. To help reduce the potential for seepage from the facility, Tintina would use "vibrating wire piezometers" above the two liners "to measure the pore water pressures within the tailings and monitor the performance of the drainage management systems."

¶39 Near closure of the mine, the uppermost layer of paste tailings would contain additional binder (4%) to decrease the potential for dust, increase surface strength, and create a more durable surface for equipment to perform reclamation activities. Tintina would take steps to remove any remaining water before installing a third HDPE liner on top of the final layer of cemented paste tailings. The third liner would be welded to the existing liner system, completely encapsulating the tailings, and then covered with five feet of non-reactive fill material and soil to be revegetated. "Any seepage or contact water within the liner, during the reclamation steps or following closure, would be captured by the internal sump and pumped to the [Water Treatment Plant, (WTP)]." DEQ determined that Tintina's proposed liner, drain, and pump system was the "best available technology" and a "best management practice" with "proven success in mining, municipal waste handling, and other industrial applications."

Operational Flexibility & Ongoing Monitoring

¶40 Throughout Tintina's application and DEQ's review materials, the importance of operational flexibility and ongoing monitoring of the deposition of the cemented tailings is emphasized. Tintina states in its application that it "may seek to optimize performance of the cement and binder additions over time operationally" and that other "binders and different ratios of binders may be used" in the surface tailings with the goal being "to provide a mass with non-flowable characteristics." Tintina further states, "[a]dditional paste design mixes may be tested in the future to optimize the effectiveness for each binder

type to meet the requirement for a non-flowable mass and weathering responses of the material in the CTF."

¶41 This flexibility accords with the recommendations of DEQ's consultant, Environmental Resource Management (ERM). ERM reviewed the Ontario lab's test results and conclusions and analyzed Tintina's proposal to use 0.5-2% binder in the surface tailings. DEQ specifically asked ERM to study whether a higher cement content should be required in the surface tailings. ERM concluded that the Ontario tests confirmed a use of 0.5-2% binder in surface tailings and did not indicate a need for increased cement content. ERM encouraged DEQ to allow a range in the binder contents to respond to operational variability, including varying temperatures, humidity, precipitation, and ore characteristics.

¶42 The effectiveness of Tintina's on-the-ground adjustments to binder content and total solid content will be ensured by ongoing monitoring. Tintina's TOMS Manual outlines performance parameters for various aspects of CTF operations, including the tailings delivery and deposition system and the foundation drains system. The Manual shares in detail the regular monitoring plans for these systems during and after CTF construction. For example, Tintina will inspect monthly for slope deviation and "cracking, slumping, erosion, slope failure and any other deformational features in the upstream slope, downstream slope[,] and embankment crest." Tintina will inspect for defects in the liner system bi-monthly. The surface of the deposited tailings will be inspected bi-weekly "for significant occurrences of water pooling," and the tailings flow rate and total volume will be recorded daily. Further, Tintina's Engineer of Record (sometimes referred to as EOR)

will oversee CTF construction and complete an annual inspection of the CTF.[9] ERM identified such "diligent monitoring to confirm closure with design assumptions, compliance standards, and goals" as a best management practice.

Substantial Evidence of Non-Flowability

¶43 A careful review of the record, summarized in the sections above, reveals substantial evidence—evidence that a reasonable mind might accept as adequate—to support DEQ's conclusion that the surface tailings at the Black Butte Copper Mine would be stable and non-flowable. *See Bachmeier*, ¶ 30.

¶44 In a recent decision, we found a DEQ decision supported by substantial evidence where, in the face of conflicting data in the record, the agency articulated a satisfactory explanation for its action. In *Park Cty. Envtl. Council*, DEQ concluded that there would be no significant environmental impact from groundwater quality issues associated with a mining company's proposed exploration. ¶ 39. The district court determined that DEQ's analysis fell short in part because the agency selectively relied on borehole data from the 1970s while ignoring other, less optimistic, water quality data collected in the area. *Park Cty. Envtl. Council*, ¶ 15. We disagreed with the district court, concluding that DEQ articulated a satisfactory explanation for why it relied on the borehole data more than data from other samples—the borehole data provided the most representative samples for predicting the impact of the proposed drilling based on similar location. *Park Cty. Envtl.*

[9] Under the MMRA, Tintina was required to designate an Engineer of Record to oversee the designs and other documents pertaining to the tailings storage facilities; the EOR "may not be an employee of an operator or permit applicant." Section 82-4-375(3), MCA. Tintina's designated EOR for the Black Butte Project is Ken Brouwer, President of Knight Piésold Consulting.

Council, ¶¶ 39-41. We cautioned that the "process of assigning relative weights to conflicting data for predictive purposes is essentially a technical exercise requiring agency expertise that should be afforded substantial deference." *Park Cty. Envtl. Council*, ¶ 43. Even though environmental groups pointed to a 2000 report questioning the borehole data, DEQ provided legitimate scientific reasons for its decision nevertheless to rely on it. *Park Cty. Envtl. Council*, ¶¶ 42, 43. We stated that the district court "erred in substituting its judgment for that of the agency regarding which samples were most predictive of the environmental impacts." *Park Cty. Envtl. Council*, ¶ 43.

¶45 The District Court here similarly erred in substituting its scientific judgment for DEQ's. DEQ's administrative record contains substantial evidence to support its conclusion that Tintina's surface tailings will be non-flowable. First, Tintina proposes to dewater its tailings into an ultra-thickened paste. The stability of ultra-thickened paste tailings, without binder, is supported by research in the record and evidence of other facilities that deposit such tailings and achieve "geotechnical stability" within days. Second, Tintina proposes to deposit the paste tailings in thin lifts—a practice identified in the Enviromin Report as allowing sufficient desiccation to provide required stability. Third, Tintina proposes to add 0.5-2% binder to its surface tailings, an innovative practice which the Ontario experimenters stated would allow the tailings to consolidate within a few days and which the working group identified as supportive of structural integrity. DEQ's consultant ERM reviewed the Ontario results and confirmed that the proposed range would be non-flowable. Fourth, Tintina proposes to use a liner and pump system to

discharge from the CTF any bleed water and water from rainfall or flooding. Fifth, Tintina proposes to retain flexibility in the exact binder content to respond to on-the-ground realities of varying weather and varying total solid content of the tailings. Sixth, and finally, Tintina will engage in ongoing monitoring to ensure the mass is non-flowable during operations and at closure. This record evidence, reviewed and analyzed by an independent review panel and DEQ and its consultants, demonstrates that DEQ evaluated the science. DEQ's determination of non-flowability of the surface tailings was not "apparently random, unreasonable, or seemingly unmotivated based on the existing record." *Clark Fork II*, ¶ 34 (quotations omitted).

¶46 The District Court relied heavily on two selected pieces of the record—the Ontario lab's conclusion that a mix with 2% binder "does not achieve final set until approximately 28 days age" and evidence from a study cited in the Enviromin Report that "drying of deeper layers of paste tailings appears to have been inhibited by addition of a final cemented-paste layer." DEQ and Tintina dispute the court's characterization of these pieces of the record—arguing 1) that there is a difference between a cemented mass setting into a non-flowable mass and achieving "final set" and 2) that the study relaying concerns about drying of deeper layers was conducted by layering cemented paste tailings on top of uncemented paste tailings, a practice different from the one proposed here. The Dissent adopts the District Court's concern, asserting that no record evidence supports DEQ's conclusion that the tailings will consolidate in a matter of days. Dissent, ¶ 117. This misapprehends the evidence DEQ considered.

¶47 First, the statement isolated by the District Court regarding inhibition of drying by the addition of a final cemented-paste layer failed to include the report's additional observation from the study "that this [final] layer was only 4 cm thick, which may influence the observed desiccation and crack formation." Second, the record substantiates DEQ's conclusion about consolidation. Knight Piésold explained that "[t]he tailings are low permeability with a hydraulic conductivity in the order of $8x10^{-8}$ m/sec. The tailings are highly thickened prior to deposition, and most of the remaining interstitial water will hydrate the cement and remain trapped in the tailings, with limited bleed water."[10] Moisture in the tailings is important both to prevent dust emissions from the layers and to ensure the paste-tailings can be pumped to the CTF. As ERM noted in its December 29, 2017 Technical Memorandum, "[p]umpability of the cement paste is critical for the success of this method." The purpose of the binder for the surface-placed tailings is to allow the pumpable paste to achieve a dry, consolidated material, which the testing lab opined would occur within "a few days." Third, as explained by the testing lab's senior engineer, the cemented-paste tailings, spread in thin layers in the CTF, are "not required to achieve compressive strength for support." ERM determined:

> Due to the essentially continuous layered flow of cemented paste into the CTF, repeated wetting and drying cycles would be localized in the area and few in number. Due to its own mass and confinement of the lower portion, significant crack propagation from deterioration is not expected within the CTF mass.

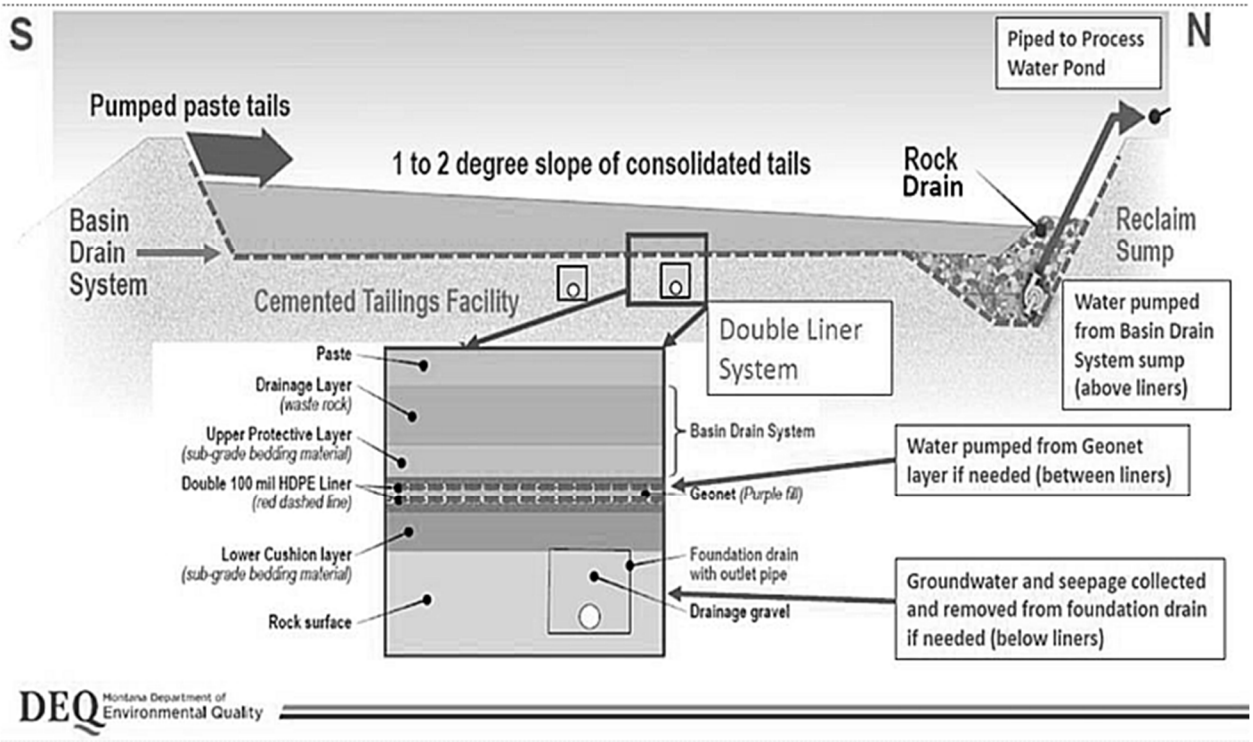
[10] Bleed water will be directed to the water reclaim system within the impoundment.

¶48 The District Court's comparison of a single study using *uncemented* tailings does not support a conclusion that would contradict DEQ's determination, made from consideration of its experts' analyses and recommendations. DEQ's decision to allow Tintina to layer thin lifts on an average of every seven to fifteen days with 0.5-2% binder is backed by the evidence relayed above, and DEQ explained its need to weigh competing concerns such as the potential for oxidation (discussed below) and dust (generated if dry tailings are exposed for too long). DEQ also weighed the need to be able to pump the tailings and to allow them to flow into a sloped formation for drainage before becoming non-flowable.

¶49 The District Court also took issue with Tintina's failure to test—and DEQ's failure to demand a test—of a mixture with 0.5% binder, given that the mine proposes to use a 0.5-2% range of binder. Seizing on this point to conclude that DEQ acted arbitrarily, the Dissent suggests that the Court's discussion of the overall structural integrity of the CTF simply "deflect[s] concerns about the stability of the tailings themselves." Dissent, ¶ 122. But a reviewing court must examine "the entirety of DEQ's rationale." *Water for Flathead's Future*, ¶ 24 (citing *Park Cty. Envtl. Council,* ¶ 18). The whole point of DEQ's five-year review process was to assure stability and safety of the tailings storage facility. The Dissent overlooks three critical points.

¶50 First, cementation of the already thickened (de-watered) paste tailings is just one of four separate measures that will be used to ensure stability of the tailings. The permit requires three other levels of protection: (1) containment within two impermeable HDPE

liners; (2) surrounded by an embankment; and (3) with three different seepage pumping systems that will remove excess water from the CTF. These protective measures are illustrated graphically in the following diagram, found in the administrative record:



¶51 No one—not MTU, not the District Court, and not the Dissent—takes issue with any of the other three measures. There is record support that even the embankment and HDPE liners together, neither of which the District Court or MTU faulted—would be sufficient to make the storage facility safe and stable. The Dissent barely mentions these features, except to suggest that "structural integrity" does not ameliorate need for "the stability of the tailings themselves." Dissent, ¶ 122. But the record is replete with studies and data about achieving a non-flowable mass for the tailings stored above ground. Cementing the paste tailings provides an additional protective feature, which—after

extensive evaluation—Enviromin reported would meet "the highest level of tailings safety management" and posed an extremely low-to-no risk of catastrophic failure.

¶52 Second, in choosing a range of binder content for the CTF, DEQ did not pick an arbitrary number. The lower end of the range, 0.5%, was not invented by Tintina to save costs or drawn at random by the agency without basis. The Ontario lab tested a range of total solid content and a range of cement binder (0%, 2%, and 4%) that encapsulates the complete range DEQ ultimately authorized. Results from those experiments were analyzed by Tintina, by Tintina's consultants, and by DEQ's consultant. All agreed there was no conclusive evidence that 4% binder was needed for surface tailings, as there was no need for unconfined compressive strength in the surface tailings like there was in the backfill tailings. All agreed that a lesser percentage of binder, in combination with other aspects of the CTF's design and operational flexibility, would be beneficial in the safety and stability of the CTF. DEQ and Tintina cite to the fact that the experiments demonstrated that a high total solid content and 0% binder might slump less than a cylinder with low solid content and 4% binder. DEQ adopted the precise range recommended by the scientific laboratory that conducted the full range of testing—and only after having its own consultant ERM conduct further analysis, which concluded that "the testing regimen supports the selected cement content levels and does not indicate a need for or benefit from increased cement contents." As noted earlier, ERM encouraged DEQ to allow a range to respond to operational variability, including varying temperatures, humidity, precipitation, and ore characteristics. By following this recommendation, DEQ did not act arbitrarily.

The District Court did not explain, and MTU did not substantiate in the record, how additional testing could have added to the scientific analysis resulting from the 0 to 4% range of binder tested or how DEQ's failure to require testing of yet another variant within that range rendered its decision arbitrary in the face of all the scientific data and expert recommendations it considered. Focusing "on the validity and appropriateness of the administrative decision-making process," *Clark Fork I*, ¶ 47, the record makes clear that DEQ did not "rel[y] on incorrect assumptions or data," *Envtl. Def. Ctr. v. Bureau of Ocean Energy Mgmt.*, 36 F.4th 850, 872 (9th Cir. 2022), but on testing and recommendations made from expert analysis. Drawing conclusions from such analysis "is essentially a technical exercise requiring agency expertise that should be afforded substantial deference," *Park Cty. Envtl. Council*, ¶ 43, so as to avoid "interfering with the administrative authority over the decision itself," *Clark Fork I*, ¶ 47.[11]

¶53 Third, neither core sample cylinder testing nor examination of other studies could replicate conditions in the field. Importantly, as ERM observed, continuing further testing

[11] The Ninth Circuit cases cited by the Dissent are readily distinguishable. In *Envtl. Def. Ctr.*, for example, the U.S. Department of the Interior granted offshore well stimulation treatment (fracking) permits without conducting an EIS on the basis of its unfounded assumption that such treatments "would happen so infrequently that any adverse environmental effects would be insignificant." 36 F.4th at 873. The record showed, however, that the agency had no formal data collection system in place to track such activity and had in fact approved at least 51 permits "without conducting [any] environmental review" and acknowledged that it "[could not] be sure just how often fracking has been allowed." 36 F.4th at 873. Even there, the court determined that the "gaps and errors underlying the agencies' assumption . . . would not be as critical if this assumption was not central to the agencies' finding of no significant impact." 36 F.4th at 874. And the defect in *Lands Council v. Powell* was—similar to our ruling in *Mont. Env'l Info. Ctr. v. Westmoreland Rosebud Mining, LLC*, 2023 MT 224, ¶¶ 61-70, 414 Mont. 80, ___ P.3d___,—that the agency had failed to properly evaluate cumulative effects of the proposed project and ignored key variables in that analysis. 395 F.3d 1019, 1027-28, 1031-32 (9th Cir. 2005).

"follows prudent practice" and will "allow[] changes to accommodate varying ore and tailings characteristics, as well as changes in binder and admixture sources and requirements." That is why DEQ required continued monitoring and assessment to determine the right binder content level. This "adaptive management" flexibility is expressly within the contemplation of the MMRA. *See* § 82-4-301(2)(b), MCA (calling for consideration of "site-specific conditions and concerns" in specifications for tailings storage facilities); § 82-4-301(2)(c), MCA (allowing "adaptive management using evolving best engineering practices based on the recommendations of qualified, experienced engineers"); § 82-4-301(3), MCA (recognizing that "tailings storage facilities must vary according" to "geological, topographical, climatic, biological, and sociological conditions" applicable to each facility).

¶54 DEQ's ultimate conclusion that, based on all relevant evidence and its acknowledgment of a certain amount of scientific uncertainty, Tintina's proposed range of binder content, in conjunction with adaptive management, would provide for a non-flowable mass was reasonable, had substantial support in the record, and accords with the adaptive vision set forth in MMRA. *See* §§ 82-4-301(2)(c), -301(3), MCA.

Oxidation

¶55 The District Court concluded that DEQ "did not rationally evaluate the potential that oxidation could undermine the stability of the tailings facility," despite DEQ's admission "that exposure to oxygen and water would cause the tailings to oxidize which—if widespread—could cause Tintina's solid tailings to deteriorate and lose their structure."

The District Court relied on evidence in Enviromin's Surface-Placed Cemented Paste Tailings Report, which indicated "the potential for oxidation pathways into lower layers of surface-disposed paste tailings." The court reasoned that in the face of evidence that oxygen could permeate below the tailings surface and that cracking could be exacerbated by layering cemented tailings over wet tailings, DEQ's approval of Tintina's plan to deposit frequent lifts to prevent oxidation was arbitrary.

¶56 DEQ and Tintina again argue that the court relied on selective record evidence and misread that evidence. MTU responds that the court correctly identified that DEQ improperly disregarded "alarming results of the *only* tests Tintina performed to examine the oxidation potential of the company's tailings, instead relying on an insufficiently supported assertion that, because each tailings layer would be quickly layered over and therefore remain insulated from oxygen and water, widespread oxidation would not occur." (Emphasis in original.)

¶57 MTU refers to the Humidity Cell Tests (HCTs) conducted by Tintina. Tintina conducted the HCTs to determine whether tailings in the CTF could oxidize when exposed to air and water and release acid harmful to the environment. Experimenters prepared and tested samples of tailings material sourced from the proposed mine site, added 2% and 4% binder to some, and formed the samples into columns. Experimenters then aerated the samples "with alternating cycles of humid and dry air, followed by weekly flushing with a relatively large volume of water." The column then was allowed to drain, and the cycle repeated weekly. Samples—with and without binder—produced acid quickly under the

testing conditions and eventually disaggregated. DEQ described the results as indicating that "the cemented paste tailings could potentially oxidize if exposed to air and water and release acid."

¶58 DEQ reasoned, however, that the on-the-ground conditions at the CTF would be less aggressive than the HCTs. In reaching this determination, DEQ relied on Enviromin's analysis of the HCT data, which stated:

> It is likely that these HCTs conservatively represent the potential rates of oxidation for cemented paste tailings, because tests were run on small, laterally-unconfined cylinders with a higher surface area to mass ratio than would exist within the more massive CTF deposits. Furthermore, it is widely accepted that sulfide oxidation in an HCT, which optimizes and accelerates the intrinsic oxidation rate, is typically greater than that under field conditions. Therefore, the disaggregation observed in these tests is considered conservative with respect to ultimate field conditions. The results of early weeks of testing, prior to excessive disaggregation, are, thus, more relevant to geochemistry of paste tailings in the CTF.

DEQ's consultant ERM acknowledged that the HCTs demonstrated that added binder "is not sufficient to neutralize the sulfide in the tailings" but emphasized that the binder was not added with the intent to do so. The binder, instead, was added to change the physical properties of the tailings to a stable, non-flowable material with low hydraulic conductivities. DEQ also relied on Enviromin's Report on Baseline Environmental Evaluation of Waste Rock and Tailings, which concluded that the HCTs "demonstrate that paste-amended treatments have lower potential for acid, sulfate, and metal release than HCTs of raw tailings."

¶59 DEQ also considered evidence beyond the HCTs and analyses of the HCTs. For example, DEQ considered that the low permeability of ultra-thickened paste tailings

restricts the flow of oxygen through the material and limits the potential for sulfide minerals to oxidize and produce acid. The effectiveness of low permeability in addressing oxidation—even in a mine with high-sulfide tailings—was supported by findings in Enviromin's Report on Surface-Placed Cemented Paste Tailings. Additionally, DEQ considered Knight Piésold's reporting, which stated that the addition of binders such as slag and fly ash has "improved resistance to sulfate attack over cement." DEQ also considered Tintina's proposed measures to optimize cement and binder additions over time and to use a lined facility to collect and treat water. Both measures were supported by Knight Piésold and Enviromin to address potential oxidation. Finally, DEQ considered Tintina's proposal to cover lifts in a timely manner to minimize oxidation of the uppermost exposed lift, a practice recommended by Enviromin. The Enviromin Report shared that the Bulyanhulu Mine's "continuous application of lifts on a 5-day depositions cycle prevented oxidative weathering of exposed surfaces." Enviromin's April 2017 report recommended "that the cement pasted material be covered in a timely manner (*on the scale of weeks*) to minimize oxidation, acidity, and leaching of metals." (Emphasis added.) Enviromin also observed that "[d]espite the exposure to air, the low permeability of paste tailings limits oxidative weathering." Pointing to a 2008 study, it reported "that while seepage from surface-placed paste tailings is extremely unlikely, because they have very low hydraulic conductivity by design, any potential seepage to groundwater could be mitigated with the use of clay or synthetic liners." The report concluded:

> Due to the potential for release of various metals at different times in the predicted weathering process, Tintina proposes to encapsulate all waste rock

> in paste tailings within the double-lined CTF impoundment. Furthermore, Tintina proposes to collect all seepage from the waste rock stockpile, the CTF, and the underground workings for treatment prior to discharge via underground infiltration galleries. With implementation of these engineering controls, potential for negative impacts to surface and groundwater is low.

¶60 The District Court did not consider, and the Dissent brushes past, the double HDPE liners that will encapsulate the CTF and the seepage-collection systems—the very mitigation to which the science points. Enviromin's analysis further supported Tintina's use of covering the final lift with a third liner and soil and vegetation to eliminate long-term exposure of lifts.

¶61 The District Court disagreed with the reasonableness of DEQ's review of oxidation by emphasizing evidence from a study cited by the Enviromin Report that stated that layering new lifts over wet tailings created the potential for oxidation pathways and cracking of lower layers. The full picture from Enviromin's report, however, is not as clear as the court states. The report states that researchers initially conducted thirty-week layered column leaching tests using varying proportions of cement in sulfidic paste tailings. The initial study concluded that modest amounts of cement presented an effective way to stabilize sulfide minerals in a surface placement scenario. The same researchers later published results from a long-term study of lab-scale cemented paste tailings placed within layers of paste tailings. They observed "that the pH did not drop despite the development of preferential oxidation paths and persistent desiccation cracking." DEQ's commissioned technical memorandum reflected this understanding, stating that "[n]ot all cracking is deleterious, as some reaction products simply fill the cracks, retaining hydrologic and even structural integrity." The District Court, citing the possible oxidation paths and cracking,

failed to acknowledge that DEQ considered them and rationally relied on evidence of their non-deleterious nature.

¶62 Finally, both the District Court and the Dissent single out the Bulyanhulu Mine among the numerous studies cited in the Enviromin Report on Surface-Placed Cemented Paste Tailings, suggesting that DEQ arbitrarily disregarded Bulyanhulu's application of lifts on a five-day cycle. It bears emphasis that the Bulyanhulu Mine uses *no binder*, just paste tailings. Enviromin's detailed study of the core samples taken here recommended covering the lifts "on the scale of weeks." The Dissent criticizes what it views as DEQ's non-specific requirement for "thin" lifts, faulting the agency for not saying how thin is "thin." Dissent, ¶ 120. The Bulyanhulu study defined "thin" at that site as 30cm, which was based on site-specific conditions. As mentioned before, the record shows the importance of such site-specific considerations, including ore and tailings characteristics and the wide temperature fluctuations existing at the Black Butte location. Further, based in part on its review of the Bulyanhulu Mine, Enviromin recommended placing the cemented paste tailings within a lined surface facility "to offer the best-available environmental controls." DEQ adopted this recommendation. Finally, MTU points to nowhere in its comments that it suggested DEQ must put specific parameters on the "level of thickness" of the lifts. For the Court to do so now would go beyond the "intense scrutiny" we have eschewed in reviewing an agency's determination of such matters. *Mont. Wildlife Fed'n*, ¶ 43; *Clark Fork I*, ¶ 47.

¶63 Given the above evidence, we disagree with the District Court's characterization of DEQ's review of the issue of oxidation as random or unreasonable. Again, DEQ balanced various concerns—ensuring that tailings would have time to set into a non-flowable mass and covering tailings in a timely manner to prevent exposure and oxidation. DEQ identified that the following aspects of Tintina's proposed CTF addressed oxidation concerns: 1) deposition of tailings as an ultra-thickened paste with low permeability; 2) layering of successive lifts within seven to thirty days before extensive oxidation could occur; 3) ensuring no tailings were left exposed at closure; 4) using a lined facility with drains and pumps to treat discharged water; and 5) utilizing flexibility in binder type and amount and ongoing monitoring to address issues that arise. Evidence of a study of non-deleterious cracking—which DEQ reviewed—does not negate the reasonableness of DEQ's decision. The record demonstrates that DEQ rationally evaluated the potential for oxidation in the tailings and contains sufficient evidence to ensure the CTF's safety and stability.

Liquefaction

¶64 The District Court concluded that DEQ also failed to examine rationally the potential for tailings liquefaction. Liquefaction occurs "when an otherwise solid material, usually partially saturated with water, loses strength and flows like a liquid" in response to a seismic event, mine blasting, or slope instability. In reaching its conclusion, the court relied on Enviromin's summary of a review of a British Columbia tailings facility that indicated "the most likely mechanism for failure would be liquefaction of the pasted

tailings as a result of seismic activity." The court also relied on Enviromin's summary of research conducted in 2002 to study "the minimum proportion of cement required to prevent liquefaction of cemented-paste tailings backfill at the Neves Corvo Mine in Portugal." That study "concluded that the minimum content must be greater than 1% to prevent liquefaction." The court determined that Tintina's proposed use of as little as 0.5% binder in the surface tailings in light of this evidence rendered DEQ's confidence in the safety and stability of the CTF arbitrary.

¶65 DEQ and Tintina argue that DEQ evaluated and correctly approved Tintina's proposal to address the risk of liquefaction of the surface tailings. They point to DEQ's reliance on dewatered and non-flowable cemented tailings, which DEQ determined would result in a very low permeability, "preclud[ing] liquefaction." DEQ and Tintina also argue that DEQ further considered Tintina's plans to address any excess water with its drain and pump system. DEQ and Tintina contend once again that the record evidence relied on by the District Court was inapposite and that the District Court stepped outside its role in reviewing a DEQ permitting decision.

¶66 MTU responds that the District Court correctly concluded that DEQ omitted a meaningful analysis of the potential for liquefaction in the face of the cited concerns in the record. MTU further argues that the dewatering method that DEQ and Tintina rely on to address liquefaction is a standard practice for all paste-tailings facilities where liquefaction nevertheless remains a demonstrated concern.

¶67 Our review of the record supports DEQ's and Tintina's contentions that DEQ reviewed the issue of liquefaction and had sufficient information to determine that the CTF would be safe and stable. DEQ reasoned that the surface tailings "are a stable, non-flowable (after placement), low-strength solid when consolidated," which "precludes the risk of liquefaction or widespread release of tailings in response to impoundment failure or seismic events." Contrary to the Dissent's criticism of this conclusion as lacking "scientific references," Dissent, ¶ 135, DEQ's consultant ERM evaluated the "still-innovative technique" of mixing cement into tailings prior to surface storage, as opposed to dewatering and densification to increase the mechanical qualities of tailings. ERM determined: "The mechanical quality improvements essentially include increasing cohesion and friction angle with a commensurate increase in resistance to seismicity, with or without impounding embankments." It continued,

> With the adoption of common concrete mixing equipment to the tailings handling process, the proposed CTF would further extend the reliability and robust nature of both operational placement and long-term storage of the tailings. Rather than storing a mass that may be subject to liquefaction, the CTF would hold a solid cement mass.
>
> During operation, the susceptibility of the placed and set cement to both water infiltration and release of contained moisture would be lower than uncemented tailings. Since the contained moisture potentially would carry metals and salts, the cementation provides a desirable environmental benefit in chemical as well as mechanical terms.

Further noting the CTF's double-liner system, ERM concluded that "[t]hese robust containment systems further protect the environment from a solid mass of concrete, which would have minimal water available for release."

¶68 Much of the above-described aspects of the CTF and underlying research support DEQ's determination, such as the plans to dewater the tailings, the plans to use a drain and pump system to remove excess water (which the District Court failed to acknowledge), and the low permeability of the surface tailings, which "restricts the flow of water and movement of oxygen through the tailings and precludes liquefaction during earthquakes because there is not sufficient water stored between tailings grains to allow the material to move as a fluid in response to sudden agitation."

¶69 Alerting the court to the mere presence of conflicting information in the record—selected from case studies of different mines—is not enough to show that DEQ failed to take a hard look at liquefaction or that there is insufficient evidence of the CTF's safety and stability. What is more, DEQ and Tintina point to compelling differences from the evidence cited by the court. For example, the British Columbia mine used paste tailings without binder, and the Neves Corvo Mine study recommending a binder content greater than 1% examined cemented paste tailings deposited underground as backfill.

¶70 Though MTU cites the Neves Corvo study to support its argument that DEQ disregarded the potential for liquefaction, a closer look reveals the study's usefulness and limitations in the analysis here. The study was conducted *in situ* during active mining operations to make recommendations regarding cement content for paste backfill in the secondary stopes at the Neves Corvo mine to avoid liquefaction. K. Been, E. T. Brown & N. Hepworth, *Liquefaction potential of paste fill at Neves Corvo mine, Portugal*, Mining Technology, 111:1, 47-58 (2002) https://doi.org/10.1179/mnt.2002.111.1.47. The study

looked at paste fill placed into an underground stope—where it was subject to higher stresses than Tintina's above-ground CTF would be. To conduct the study, researchers created a trial stope away from active mining operations. After placing tailings paste with varying levels of cement binder in the trial stope and allowing it to cure for several months, the authors drilled three boreholes to collect samples. One of the three was located near the rear of the stope, where ponding of water had occurred; the samples from that borehole were noted to have been affected more as a result. It is unclear from the report the extent to which the paste fill was first thickened by dewatering, but the study noted that, without the cement binder, the paste fill "would be classified as a non-plastic, uniformly graded silt."[12] The authors recommended a minimum of 1% cement in the backfill—one-quarter of what Tintina will use in the cemented tailings deposited in the Black Butte backfill. The authors suggested it would be prudent to use "a higher (e.g. 2%)" content if the stope had a high probability of a trigger event and the consequences of liquefaction would be serious. Finally, they noted that "procedures for the placement of paste should ensure that any excess water is diverted away from the backfilling area." To the extent the takeaways from this study are useful, Tintina incorporated (and DEQ adopted) its salient recommendations into the CTF design—using a higher binder for the backfill and including three different seepage pumping systems that will remove excess water from the CTF.

[12] This is in apparent contrast to Tintina's plan to use ultra-thickened paste with a high solid content.

¶71 In sum, DEQ articulated a satisfactory explanation for its determination that Tintina's proposal adequately safeguarded against the risk of liquefaction of the cemented paste tailings. *See Clark Fork I*, ¶ 47.

Independent Review Panel

¶72 As observed, the Legislature's 2015 MMRA revisions added specific requirements for tailings storage facilities. Applicants for mining permits meet the requirement of "a plan . . . sufficient to ensure" the safety and stability of a tailings storage facility by submission of: 1) a design document; 2) a report by an IRP; and 3) a TOMS manual. Section 82-4-335(4)(l), MCA. The IRP requirements are laid out in § 82-4-377, MCA. The panel consists of three "independent review engineers" selected by the permit applicant and approved by DEQ. Section 82-4-377(2), MCA. Panelists may not be an employee of the permit applicant and may not be the design consultant, the engineer of record, or the constructor. Section 82-4-377(3), MCA. Representatives of DEQ and the permit applicant may—and the engineer of record (EOR) shall—participate on the panel, but they are not members of the panel. Sections 82-4-377(5), -377(6), MCA. The IRP "shall review the design document required by 82-4-376 [requiring 31 descriptions and analyses]." Section 82-4-377(1), MCA.

¶73 Subsections 8, 9, and 10 of § 82-4-377, MCA, explain the IRP's review process:

> (8) The panel shall review the design document, underlying analysis, and assumptions for consistency with [MMRA]. The panel shall assess the practicable application of current technology in the proposed design.
>
> (9) The panel shall submit its review and any recommended modifications to the operator or permit applicant and the department. The panel's

> determination is conclusive. The report must be signed by each panel member.
>
> (10) The engineer of record shall modify the design document to address the recommendations of the panel and shall certify the completed design document. The operator or permit applicant shall submit the final design document to the department pursuant to 82-4-376.

Section 82-4-377(8-10), MCA.

¶74 The District Court concluded that Tintina and DEQ failed to comply with IRP requirements because the panel never reviewed a complete design document for the proposed CTF prior to certifying its review to DEQ on July 28, 2017. The court found that the panel issued its certification before reviewing three required components of the design document—a seismic evaluation, a dam breach assessment, and a construction management plan. And although the court acknowledged that the panel may have received a dam breach assessment in August 2017, the court determined that any possible review at that point was untimely given that it occurred after the panel's July certification.

¶75 DEQ and Tintina argue that the panel: 1) reviewed the seismic evaluation that Tintina included in its initial design and the additional analysis Tintina included in its revised design, rendering the court's finding otherwise clearly erroneous; 2) reviewed the dam breach assessment on August 11, 2017, and determined no further reporting was needed; and 3) reviewed the substantial elements of a construction management plan despite the fact that those elements were not contained in a stand-alone document with the title "Construction Management Plan." DEQ and Tintina also assert that the IRP was not required to review a complete design document again after Tintina addressed its

recommended modifications. MTU responds that, regardless of the number of times that MMRA contemplates an IRP reviewing a design document, the IRP here never once reviewed a design document containing the three required components.

¶76 As an initial point, we agree with the District Court that the plain language of MMRA requires an IRP to examine a design document containing all elements described in § 82-4-376, MCA. *See* § 82-4-377(1), MCA ("An independent review panel shall review the design document required by 82-4-376"); § 82-4-377(8), MCA ("The panel shall review the design document . . . for consistency with [MMRA]."). It makes little sense to allow an applicant to submit to the IRP a design document wholly missing such crucial information as a dam breach analysis, allow the panel to state that such information is missing in its review, and then allow the applicant to add the analysis and submit such revisions to the DEQ without the panel seeing it. *See Hillcrest Natural Area Found. v. Mont. Dep't of Envtl. Quality*, 2022 MT 240, ¶ 47, 411 Mont. 30, 521 P.3d 766 (statutory construction should not lead to absurd results if a reasonable interpretation can avoid it).

¶77 Upon review of the record here, however, we agree with DEQ and Tintina that the IRP reviewed all substantive information required by MMRA. We do not hold, as the Dissent claims, that the applicant be allowed "to submit required information directly to the DEQ without the IRP ever seeing it." Dissent, ¶ 141. First, the record demonstrates that Tintina included some seismic analysis in its application, which the IRP reviewed before it issued its July 28, 2017 report. *See* § 82-4-376(2)(i-m), MCA. Knight Piésold submitted its first report in October 2015 and revised it eight times before its final

submission in early July 2017, prior to the IRP's final report. Noting the MMRA's requirement that new tailings dams be able to withstand the greater of either the 1-in-10,000-year earthquake event or the Maximum Credible Earthquake Event, (MCE), Knight Piésold reported that the Maximum Design Earthquake (MDE) would be updated "if required" following assessment of the MCE for the Project "in future design phases." Knight Piésold's extensive July 2017 report, which covered all aspects of the tailings storage facility, did include the results of its CTF stability analyses for both "static" and "seismic" conditions, both during operations and post-closure. The report also contained, among other things, the firm's analyses of the facility embankment, seepage control system, construction, process water pond, and operations and monitoring. Pending the IRP's review of these designs, the firm did not complete a dam breach inundation study at that time but would await the IRP's recommendations.

¶78 In its July 28, 2017 report, the IRP gave the feedback that "The MCE for the site must still be developed as the design moves forward." An August 9, 2017 letter from Knight Piésold to DEQ indicated that the IRP had "recommended that additional detail be provided on fault locations and confirmation that these faults are inactive during the detailed design phase." The letter assured that the analysis requested by the IRP was in progress and that it "is expected to confirm that the 1 in 10,000 year probabilistic event is the most appropriate MCE for the site." At an August 11, 2017 conference call with the EOR and DEQ, the IRP confirmed that it was satisfied with Tintina's materials and stated that it would not issue further recommendations. Tintina included the promised additional

seismic analysis in its revised September 12, 2017 design document to DEQ. The site-specific study analyzed the issue of faults but identified no concerns.

¶79 Second, the record demonstrates that the IRP reviewed a dam breach analysis. Tintina's EOR noted that a dam breach study "will be completed as part of future design phases . . . if required pending the review of these designs by the independent engineering review panel." *See* § 82-4-376(n), MCA. After its review of the design document, the IRP recommended a dam breach analysis be conducted. Knight Piésold conducted the dam breach analysis, and Tintina provided it to the IRP on August 11, 2017. The study concluded that the probability of failure for the various hazards was either not credible or very low. During the August 11, 2017 meeting, the IRP stated that it saw no need to modify its July 28, 2017 report in support of the permit. Tintina included the dam breach analysis results in its September 12, 2017 revised application to DEQ.

¶80 Third and finally, the record demonstrates that the IRP reviewed the substantial elements of Tintina's construction management plan. MMRA requires that the design document include:

> a construction management plan that includes, at a minimum, parameters and levels of acceptability to be monitored during construction for quality control and quality assurance purposes. The frequency of sampling, the amount of oversight, the qualifications of the oversight personnel, and the role of the panel during and after construction must be specified and agreed to by the panel.

Section 82-4-376(2), MCA. As Tintina points out, various sections of its TOMS manual meet this requirement. Section 4 describes the protocols for waste and water management facilities required during construction, including a detailed description and numerous

referenced schematics of the CTF and its two-stage construction. Section 5 details seven quantitative performance parameters for monitoring during construction and operation, which address the CTF embankment; the CTF basin drain and water reclaim systems; the CTF tailings delivery and deposition system; the CTF foundation drain; the process water pond; the non-contact water reservoir; and the mine site water balance. Each of these seven subsections includes details about the frequency of sampling during construction, instrumentation, surveillance and maintenance, and monitoring inspections. The TOMS manual also states that Tintina's third-party EOR and a panel of three independent tailings engineers would oversee the design, construction, operation, and closure of the CTF, and Tintina provided their qualifications. Though MTU argues that the TOMS manual is a separate statutory requirement, the statute does not mandate duplication if the manual contains the same construction management information. Unlike the defect we found in *Citizens for Responsible Dev. v. Bd. of County Comm'rs*, 2009 MT 182, ¶ 20, 351 Mont. 40, 208 P.3d 876, the elements of the construction management plan were not "buried in documents created primarily for *other purposes*" (emphasis added) but were prominently set forth in the TOMS manual—one of the required elements of Tintina's application under the MMRA and created for the very purpose the construction management plan is designed to address. That the TOMS manual rolled the construction management into its comprehensive operations plan does not render the submission defective under the MMRA.

¶81 We conclude that the iterative process between the IRP, the Engineer of Record, Tintina, and DEQ was acceptable under MMRA's IRP requirements. The MMRA

contemplates that the independent review will lead to a panel's recommendations, and it obligates the Engineer of Record to modify the design document to address those recommendations. Section 82-4-377(9-10), MCA. The statute does not mandate that the IRP review the EOR's modifications in response to the panel's recommendation. *See* § 82-4-377(1), MCA. Here, the panel's July 28, 2017 report expressly acknowledged "ongoing studies" yet to be carried to completion. The IRP "commended" Tintina for engaging it early in the project and anticipated the panel's continued participation.[13] MTU points to no substantive difference that would have resulted had the IRP reviewed the dam breach analysis in its first review or had Tintina resubmitted to the IRP the full seismic analysis it completed after receiving and following the IRP's recommendations. The panel reviewed all required analyses and documentation, and the EOR modified Tintina's design document in accordance with its recommendations.

¶82 The above record evidence demonstrates that the panel complied with MMRA's requirement of independent review of a proposed tailings storage facility.

. . .

¶83 DEQ satisfied MMRA and MEPA in approving Tintina's proposed CTF and the District Court erred in concluding otherwise. MMRA requires the following three items to ensure the safety and stability of a tailings storage facility before DEQ may issue a draft permit: a design document, a report by an independent panel, and a TOMS manual. Section

[13] The Dissent's suggestion that an Independent Review Panel could "become invested in its initial decision" and less willing to make additional recommendations, Dissent, ¶ 147, is unmoored from this record, purely speculative, and merits no further discussion.

82-4-335(4)(l), MCA. Tintina provided all three. DEQ took a hard look at environmental impacts during its MEPA review, engaging independent consultation along with its own scientific research and study, and articulated its rationales when it rendered the final determination. The District Court's reliance on select evidence in the voluminous record fails to demonstrate a clear error of DEQ's judgment in evaluating the proposal. The agency's decision was "scientifically driven," informed by "substantial agency expertise," and is entitled to considerable deference. *MEIC*, ¶ 20. The record supports DEQ's reasoned decision to approve the safety and stability of Tintina's proposed CTF. *Clark Fork I*, ¶¶ 21, 47.

¶84 *Issue Two: Did DEQ satisfy MEPA by rationally evaluating the environmental impact of the mine's total nitrogen discharges into Sheep Creek?*

¶85 Sheep Creek is subject to a seasonal nitrogen limit in effect from July 1 to September 30 each year. The limit derives from DEQ's non-degradation analysis, which protects high quality waters such as Sheep Creek. DEQ determined the non-degradation nitrogen limit for Sheep Creek to be 0.09 milligrams per liter (mg/L) during that three-month period. In the MPDES (water quality) permit, DEQ observed that:

> for Sheep Creek, the nitrogen standards are very low and the nonsignificance criterion is so low that the stream is already at or above this level a significant portion of the time. There is not assimilative capacity to allow a mixing zone.

¶86 Tintina proposes to pump groundwater from its underground mine to a water treatment plant, where it would undergo reverse osmosis treatment. Some treated water would be used in mining operations; the majority would be discharged to an underground infiltration gallery (UIG). The UIG consists of excavated trenches and then an alluvial

aquifer (shallow sand and gravel deposits along Sheep Creek), before discharging to Sheep Creek. Tintina's discharge to the UIG is estimated to contain an average of 0.32 mg/L nitrogen and a maximum of 0.57 mg/L. After dilution with ground and surface water, the maximum nitrogen level in the immediate area where the discharged water enters Sheep Creek is estimated to be less than 0.12mg/L, which is within the standards in place from October 1 to June 29. As part of its review, DEQ required Tintina to cease all discharge "on or before July 1" and instead hold the pumped groundwater in a storage pond until after September 30.[14]

¶87 The District Court held that DEQ violated MEPA in its review of the potential for nitrogen pollution from the groundwater that Tintina proposes to pump from its underground mine and discharge into Sheep Creek. The court took issue with Tintina's proposal to discharge water with nitrogen concentrations of up to 0.57 mg/L via the UIG up until July 1 each year to avoid violating the seasonal nitrogen limit in place July 1 through September 30. Because the record indicated that there could be a lag time of up to a few months between initial discharge and the discharge reaching Sheep Creek, the court found that DEQ's approval of continued initial discharge up until July 1 was irrational, reasoning that pre-June 30 discharge may enter Sheep Creek after July 1 and violate the seasonal limit.

[14] DEQ anticipates that Tintina's discharge of treated water may also impact so-called "Coon Creek," which is subject to the same non-degradation limit for total nitrogen as Sheep Creek. Our discussion applies to both.

¶88 DEQ and Tintina argue that the court's holding was erroneous, given record evidence of DEQ's consideration and rationale for its decision. MTU responds that DEQ's decision conflicted with the agency's own review of the relevant science because it acknowledged that, even after mixing with groundwater, discharges would exceed the non-degradation standard and could enter Sheep Creek with such excesses between July and the end of September. It maintains that DEQ thus arbitrarily overlooked the water migrating from the UIG into Sheep Creek. Importantly, MTU does not challenge this on a substantive basis—such a challenge properly would be brought to Tintina's MPDES permit under the Water Quality Act, which MTU does not contest.

> MEPA is "essentially procedural." Like its federal counterpart, "it does not demand that an agency make particular substantive decisions." Rather, it requires "an agency to review projects, programs, legislation, and other major actions of state government significantly affecting the quality of the human environment in order to make informed decisions."

Mont. Wildlife Fed'n, ¶ 32 (quoting *Ravalli County Fish & Game Assn*., 273 Mont. 371, 377-78, 903 P.2d 1362, 1367 (1995)). In reviewing DEQ's MEPA analysis, our "focus is on the administrative decision-making process rather than the decision itself." *Park Cty. Envtl. Council*, ¶18.

¶89 In the Final EIS, DEQ addressed a comment that it had failed to evaluate the lag time such that "Tintina could violate the stricter summer nitrate standards." DEQ explained that, although water released via the UIG before July 1 "might occasionally carry nitrogen at concentrations above the non-degradation effluent limits," it would be subject to attenuation "while filtrating through alluvial sands and wetland areas[.]" DEQ relied on

cited sources in support of this assessment and noted its preference for "a slow rate of nitrogen-containing-groundwater migration from the UIG to the creek, making the seasonal discharge limits important." The MPDES Permit stated that the data used to calculate the interquartile range (IQR) of the receiving water's total nitrogen concentration were collected during the July to September season in which the water quality standards apply. It explained,

> The calculations performed by DEQ will protect the stream by creating a margin of safety in the limits to account for all of the variability in the creeks, ground water, and the discharge.

¶90 The District Court found speculative DEQ's determination that the longer the discharged water remains underground, the more nitrogen will be attenuated, stating that it lacked "any supporting analysis." But the agency cited scientific literature documenting this finding, and at least two such studies on which it relied are in the administrative record. The Final EIS emphasized that:

> the slow rate of water infiltration is not a good indicator that total nitrogen could take months to reach surface water, but an indicator that total nitrogen would have time to attenuate in the soils and may never reach the creek. The well-established science behind total nitrogen in soils is that total nitrogen is rapidly taken up or denitrified to harmless nitrogen gas by microbes. For total nitrogen, DEQ would actually prefer slow infiltration and long detention time.

Although MTU expresses concern about the effectiveness of attenuation, it does not point to any contrary evidence in the record sufficient to meet its MEPA burden to establish that the agency failed to "examine the relevant data [or] articulate a satisfactory explanation for its action, including a rational connection between the facts found and the choice made."

Clark Fork I, ¶ 47. "The [party] challenging the [agency's] decision has the burden of proving the claim by clear and convincing evidence contained in the record." Section 75-1-201(6)(a)(i), MCA. *See also Water for Flathead's Future*, ¶ 12. Though not an argument raised by MTU, the Dissent speculates that DEQ unreasonably relied on attenuation studies that occurred in geographic areas different from Montana. But both attenuation studies offered strong support for their conclusions, one stating that "a remarkably small area of wetland sediment can strongly influence water quality"[15] and the other finding "small seepage wetlands" in stream headwaters to be "very effective at removing nitrogen loads."[16]

¶91 Coming to its own conclusions from the data, the Dissent also questions DEQ's reliance on the slow rate of infiltration, asserting that it "does not account for the infiltration galleries that are directly adjacent to Sheep Creek and would not have much time for attenuation to occur before reaching the Creek." Dissent, ¶ 152. This evinces another misapprehension of the agency's analysis. In the MPDES permitting process—which, it bears repeating, has not been challenged—DEQ addressed a commenter's similar concerns about the agency's determination "that Tintina will comply with the stricter summer nitrogen standard by storing effluent in [the Treated Water Storage] pond while the

[15] Stefanie L. Whitmire & Stephen K. Hamilton, *Rapid Removal of Nitrate and Sulfate in Freshwater Wetland Sediments*, J. Environ. Qual. 34:2062 (2005), https://doi.org/10.2134/jeq2004.0483.

[16] Evelyn Uuemaa, Chris C. Palliser, Andrew O. Hughes & Chris C. Tanner, *Effectiveness of a Natural Headwater Wetland for Reducing Agricultural Nitrogen Loads*, Water, Mar. 2018, https://doi.org/10.3390/w10030287.

standard is in effect." The commenter asserted, "DEQ must analyze whether there is a reasonable potential that Tintina's discharges will violate the total nitrogen standard applicable to Sheep Creek and impose additional permit requirements as necessary to meet the standard." Like in the MEPA review MTU challenges here, DEQ explained in response that, based on "well-established science behind total nitrogen in soils," the slow rate of infiltration was "an indicator that total nitrogen will have time to attenuate in the soils and may never reach the creek." DEQ added that its "main concern," and why the seasonal discharges are important, was "where the UIGs are in close proximity to Sheep Creek[,] so the total nitrogen in the discharge might quickly interact with Sheep Creek." Contrary to the Dissent's conjecture, DEQ did consider the UIG's proximity to the creek and explained its decision to cut off the discharge while the seasonal limits are in effect.

¶92 "Because assessment of environmental impact fits squarely within an agency's significant technical and scientific expertise beyond the grasp of the Court, courts afford great deference to agency decisions—here, DEQ's evaluation of the significance of potential adverse environmental impacts" from the discharge of groundwater via the UIG during the July through September season. *Water for Flathead's Future,* ¶ 21 (quotations and citations omitted). The Dissent's speculation cannot meet MEPA's standards for overturning DEQ's determination. *See* § 75-1-201(6)(a)(i), MCA. Even if the record contained conflicting evidence, "[t]he process of assigning relative weights to conflicting data for predictive purposes is essentially a technical exercise requiring agency expertise that should be afforded substantial deference." *Park Cty. Envtl. Council*, ¶ 43.

¶93 Whether a "hard look" has been given to the relevant information must "contemplate the entirety of DEQ's rationale." *Water for Flathead's Future*, ¶ 24. Considering the entire record, we conclude that MTU did not prove by clear and convincing evidence that DEQ failed to take a "hard look" when evaluating the total nitrogen content of Tintina's discharge during the summer months. The agency considered relevant data, including its extensive review for the MPDES permit, and articulated a reasoned explanation for its rationale. Its determination was supported by substantial evidence and was not arbitrary, random, or seemingly unmotivated based on the existing record. *See Clark Fork II*, ¶ 34. The District Court's ruling to the contrary is reversed.

¶94 *Issue Three: Did DEQ satisfy MEPA when it considered and dismissed alternatives to the proposed action?*

¶95 The District Court concluded that DEQ violated MEPA by failing to rationally consider alternatives to Tintina's proposed action. The court specified two alternatives in particular: a depyritization alternative and the alternative of increasing binder content in the surface tailings mixture.

¶96 MEPA requires that DEQ evaluate reasonable alternatives to a proposed action. Section 75-1-201(1)(b)(iv)(C), MCA. The agency must "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources." Section 75-1-201(1)(b)(v), MCA. "Under MEPA, an alternative analysis is defined as an 'evaluation of different parameters, mitigation measures, or control measures that would accomplish the same objectives as those included in the proposed action by the applicant.

For a project that is not a state-sponsored project, it does not include an alternative facility or an alternative to the proposed project itself.'" *Park Cty. Envtl. Council*, ¶ 47 (quoting § 75-1-220(1), MCA). "Neither the alternatives analysis nor the resulting recommendations bind the project sponsor to take a recommended course of action, but the project sponsor may agree pursuant to [the statute] to a specific course of action." Section 75-1-201(1)(b)(v), MCA.

¶97 DEQ identified twelve scoping alternatives to consider for detailed analysis. One such alternative it considered was the possibility of increasing the cement content in the tailings to reduce potential acid rock draining and water quality impacts. In the Final EIS, Appendix A and Sections 2.3.2.6 (Increased Cement Content in Tailings) and 3.6.3.2 (Proposed Action) indicate that an increase in cement content beyond 2% would not offer additional environmental benefits. Our discussion in Issue One makes clear that DEQ gave adequate consideration to this alternative. The agency reasonably chose not to require a higher concentration of cement content in the surface tailings. We need not address this argument further.

¶98 Another alternative DEQ considered was the possibility of using a depyritization method for tailings disposal. The District Court held that DEQ irrationally dismissed this alternative against the recommendation of its consultant, "alleging without analysis that it was not technically feasible and would not offer an environmental benefit." Tintina and DEQ dispute this finding. DEQ argues, citing the Final EIS, that it "provided analysis on the very issue that [the consultant] had identified as needing additional analysis:

underground storage of concentrated pyrite."[17] Tintina adds that, rather than focusing on the agency's decision-making process, the District Court simply disagreed with DEQ's resolution of conflicting evidence in the record. MTU counters that DEQ's consultant found "clear environmental advantages to removing pyrite from tailings" and recommended more consideration of its technical feasibility. MTU maintains that DEQ gave only a vague explanation in response, and the District Court appropriately faulted it for inadequate analysis of the alternative.

¶99 Depyritization is the separation from mine tailings of sulfide materials, which typically represent the largest source of acid generated at mine sites. Removal of the sulfides produces tailings with relatively benign ARD potential; but because the concentrated pyrite product has a much higher potential for acid generation, there must be appropriate disposal options. Tintina assembled a working group of eighteen scientists and engineers to identify feasible tailings storage methods for the project and rank the alternatives. Two of the six alternatives the working group studied involved either partial or full pyrite removal; they were ranked last among the alternatives. DEQ sought further review of those two alternatives from its own consultant, ERM, which submitted a technical memorandum at the end of 2017 analyzing the depyritization alternatives.

¶100 The ERM report noted that the cemented paste tailings option the working group ranked first—despite having a "markedly higher total cost of paste tailings disposal"—would minimize potential environmental impacts, including having the lowest impact to

[17] Pyrite (FeS2) is an iron sulfide mineral.

nearby designated wetlands, and that the CTF location alternative had "the smallest catchment area footprint." ERM also noted "some clear environmental advantages to removing pyrite from tailings" and discussed some of the additional costs and practical limitations the working group considered. ERM recommended that more consideration be given to technical feasibility "rather than cost feasibility," which it noted was among the reasons the working group rejected a depyritization alternative. In particular, ERM suggested it was unclear how much more underground volume would be needed to dispose of the concentrated pyrite fraction of the tailings.

¶101 Both MTU and the District Court selectively cite DEQ's response to comments in the Final EIS to conclude that the agency gave short shrift to ERM's recommendations. But both in the Description of Alternatives and in the Consolidated Response to concerns regarding depyritization, DEQ explained its rationale, finding "no net environmental benefit to full sulfide mineral separation prior to tailings disposal when compared to the Proposed Action." The Dissent asserts that DEQ did no more than "stat[e] there would be no net environmental benefits[.]" Dissent, ¶ 158. The agency, however, acknowledged the reduced risk of ARD but found problematic the challenges presented by either onsite or offsite long-term storage and disposal. DEQ noted that it had been unable to find any available options for offsite storage through operations in Montana or other western states that would accept sulfide concentrates for disposal. Because it may not be feasible to convert the pyrite concentrate into a cemented paste that would cure properly, the agency determined that additional storage space on the mine site would require either a surface

disposal facility or mining un-mineralized rock in order to provide storage, generating perhaps as much as 7.6 million tons of additional waste rock to be disposed of on the surface. Additional management strategies would have to be developed for long-term storage to mitigate oxidation or spontaneous combustion, which DEQ concluded "may not be technically feasible." The alternatives analysis also pointed out that de-pyritizing tailings uses more functional wetlands.

¶102 MTU seizes on DEQ's use of the word "may" in several places within the discussion, arguing that it insufficiently examined the alternative to show "a rational connection between the facts found and the choice made." *Clark Fork. I*, ¶ 47. A court does not review an agency's MEPA analysis, however, to determine whether a different conclusion could have been reached. The court instead examines the agency's explanation to determine whether it considered "the relevant factors and whether there has been a clear error of judgment." *Park Cty. Envtl. Council*, ¶ 18 (quoting *Clark Fork. I*, ¶ 21). Again, we focus on "the validity and appropriateness of the administrative decision-making process without intense scrutiny of the decision itself." *Clark Fork. I*, ¶ 47. Here, DEQ appropriately had its independent consultant take a deeper look when Tintina's working group emphasized cost considerations in dismissing the depyritization alternatives. ERM identified technical feasibility issues it suggested be considered more carefully, and DEQ's final review shows that the agency considered those challenges and decided to accept the cemented paste tailings option (with modification) as the preferred action. MTU has not

demonstrated that DEQ failed its responsibility under MEPA to consider reasonable alternatives to the proposed action. *See* § 75-1-201(1)(b), MCA.

¶103 The standards for a court's review of an agency's determinations are well-settled. The court does not supply its own "intense scrutiny of the decision." *Mont. Wildlife Fed'n*, ¶ 43. It instead reviews the agency's decision-making process for whether it acted arbitrarily and capriciously. *Water for Flathead's Future*, ¶ 12. Review under this standard does not permit reversal even if the record contains inconsistent evidence or evidence that could support a different result. *Water for Flathead's Future*, ¶ 12. If the agency has articulated "a rational connection between the facts found and the choice made," the decision will be upheld. *Clark Fork I*, ¶ 47.

CONCLUSION

¶104 After carefully reviewing the record, we are satisfied that DEQ made a reasoned decision. *Clark Fork I*, ¶ 21. Compiling an extensive record of scientific studies, expert examinations, engineering reports, testing, and comparison with other mining facilities around the world, and after considering a wide range of comments from members of the public, including the Appellees, DEQ made a scientifically driven permitting decision that was supported by substantial evidence. For the reasons explained in this Opinion, the District Court's order is reversed, and the case is remanded to the court to reinstate DEQ's decision to grant Tintina's permit.

/S/ BETH BAKER

We Concur:

/S/ MIKE McGRATH
/S/ JAMES JEREMIAH SHEA
/S/ JIM RICE
/S/ DIRK M. SANDEFUR

Justices Ingrid Gustafson and Laurie McKinnon, dissenting.

¶105 We disagree with the Court's decision to reverse the District Court's order revoking the permit DEQ granted Tintina to construct the Black Butte Copper Mine. We would uphold the District Court's conclusion that DEQ's approval of the permit was arbitrary and not supported by substantial evidence.

¶106 The Montana Constitution provides at Art. II, Section 3, that each of us enjoys inalienable rights, including "the right to a clean and healthful environment" and at Art. IX, Section 1(1) that "[t]he state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations." The Legislature enacted the Montana Metal Reclamation Act (MMRA) and MEPA to help meet its constitutional obligation to prevent unreasonable environmental degradation. *See* 2003 Mont. Laws ch. 361, § 5 (HB437); *see also* § 75-1-102(1), MCA (MEPA's purpose), § 82-4-302, MCA (MMRA's purpose), *Park Cnty. Envtl. Council v. Mont. Dep't of Envtl. Quality*, 2020 MT 303, ¶ 67, 402 Mont. 168, 477 P.3d 288.

¶107 The proposed Black Butte Mine, operated by Tintina, is located adjacent to Sheep Creek within the Smith River watershed. Tintina proposes to build a large copper mine—to extract 14.5 million tons of copper ore over 13 years. This is expected to generate 12.9

million tons of tailings, acid-generating processed minerals separated from the copper ore, and 0.8 million tons of waste rock which will contain high-levels of acid-generating minerals and toxic metals, including nickel, thallium, strontium, copper, lead, arsenic, and uranium. The copper ore deposit to be mined is a sulfide ore body with high levels of acids and toxic metals when exposed to air and water. Mining sulfide ore bodies, particularly close to ground or surface water, presents inherent pollution risks, and even careful water treatment and tailings waste management may be insufficient to avoid discharging noxious chemicals to adjacent ground or surface water. Tintina intends to dispose of about half of the mine tailings by backfilling underground areas of the mine with a mixture of cement and tailings. The remainder of the tailings and all of the rock waste will be deposited aboveground in a cemented tailings facility (CTF). A retaining dam would be used to attempt to prevent the CTF from collapsing and discharging mine waste into Sheep Creek. Tintina further proposes to convert the tailings into a non-flowable, low-strength solid by consolidating them with cement, slag, and or fly ash.

¶108 When reviewing an application for a mining permit, DEQ must take a hard look at environmental impacts of the proposed mine. *Clark Fork Coal. v. Mont. Dep't of Envtl. Quality*, 2008 MT 407, ¶ 47, 347 Mont. 197, 197 P.3d 482 [hereinafter *Clark Fork I*]. An agency must make an adequate compilation of relevant information, analyze it reasonably, and consider all pertinent data. *Clark Fork I*, ¶ 47. The Court's reversal of the District Court's Order allows a project with major environmental consequences to proceed despite inadequate analysis and data in several key areas critical to the safety of the project. The

Court correctly points out our caselaw supports deference to agencies for decisions implicating substantial agency expertise and assigning weight to conflicting data. Opinion, ¶¶ 11-12 (citing *Clark Fork I*, ¶¶ 21, 47; *Mont. Envtl. Info Ctr. v. Mont. Dep't of Envtl. Quality*, 2019 MT 213, ¶ 20, 397 Mont. 161, 451 P.3d 493). However, there is a difference between allowing an agency to weigh conflicting evidence and give a reasoned explanation and allowing the agency to have significant gaps remain in the data or extrapolate beyond what the data supports. It is true we do not reweigh the evidence or take a hard look ourselves, but part of ensuring the agency took a hard look is to confirm the agency thoroughly investigated the environmental implications of the project. *Clark Fork I*, ¶ 47.

¶109 While we have not found Montana case law where the agency did not take a hard look, there is federal caselaw that demonstrates when an agency has not addressed significant gaps in the data or has made inappropriate extrapolations. We have previously held "since MEPA is modeled after the National Environmental Policy Act (NEPA), federal case law construing parallel provisions in NEPA is persuasive." *Mont. Wildlife Fed'n v. Mont. Bd. of Oil & Gas Conservation*, 2012 MT 128, ¶ 32, 365 Mont. 232, 280 P.3d 877. The same requirement that agencies take a "hard look" is in federal caselaw construing NEPA. *Envtl. Def. Ctr. v. Bureau of Ocean Energy Mgmt.*, 36 F.4th 850, 872 (9th Cir. 2022). An agency cannot "rely on incorrect assumptions or data" when determining no significant environmental impact will occur. *Native Ecosystems Council v. United States Forest Serv.*, 418 F.3d 953, 964 (9th Cir. 2005). The Ninth Circuit has reversed permits based on inadequate NEPA analyses due to incorrect assumptions, gaps

in the data, and failure to disclose shortcomings in the data or models. *Envtl. Def. Ctr.*, 36 F.4th at 874; *Lands Council v. Forester of Region One of the United States Forest Serv.*, 395 F.3d 1019, 1037 (9th Cir. 2004). This is exactly the case here, where the District Court correctly identified many areas where the data was lacking or incorrect assumptions were made.

¶110 Additionally, when the consequences of certain environmental decisions are greater, it is even more imperative we take a critical look at potential gaps and extrapolations. While DEQ did compile a voluminous and informative administrative record, it cannot make up for the concerning gaps in the data and unwarranted extrapolations.

¶111 We would conclude the District Court correctly found: (1) DEQ violated the MMRA and MEPA when it approved the safety and stability of the proposed CTF; (2) DEQ violated the MMRA when it did not require Tintina to abide by the Independent Review Panel (IRP) requirements; (3) DEQ violated MEPA when it approved the nitrogen discharges into Sheep Creek; and (4) DEQ violated MEPA by failing to properly analyze alternative storage facility designs.

¶112 ***1. Did DEQ satisfy MMRA and MEPA when it approved Tintina's proposed tailings storage facility?***

A. DEQ violated the MMRA and MEPA when it approved Tintina's permit.

¶113 The MMRA mandates that tailings storage facilities meet certain requirements to protect human health and the environment. Section 82-4-301(2)(b), MCA. Before mining, the MMRA requires applicants to obtain a mine operating permit from DEQ. Section 82-4-335(1), MCA. Additionally, the applicant must submit a plan detailing the design,

operation, and monitoring of impounding structures, including tailing storage impoundments, *sufficient to ensure that the structures are safe and stable*. Section 82-4-335(4)(l), MCA (emphasis added).

¶114 Here, the District Court found the DEQ failed to ensure the safety and stability of Tintina's tailings facility. Specifically, the District Court found DEQ failed to rationally consider: (1) whether the mine tailings mixed with 0.5% cement and binders would form and maintain a solid, non-flowable mass, (2) whether oxidation would undermine the stability of the mass, and (3) whether there was potential for tailings liquefaction and what impact that would have.

1. Stability: DEQ's analysis failed to properly determine whether the tailings will form a stable, non-flowable mass.

¶115 The Court concludes there was substantial evidence for DEQ to confirm the tailings facility would be safe and stable, but this conclusion overlooks concerning gaps in the data that were never properly accounted for and record evidence contradicting their findings that was not adequately addressed in the final EIS. Opinion, ¶ 54. Mixing the tailings with cement binder and storing that mixture above ground is a novel approach to tailings storage that has never been fully implemented in the field. While this novel approach could be more environmentally protective than previous methods, it does not mean adequate testing and analysis can be bypassed. Since this is a new type of facility, with no similar facilities to compare with, it is necessary to ensure every aspect of review is thoroughly completed because of the potential catastrophic consequences. DEQ's assumptions underlying the

tailings being non-flowable are not fully supported by the record and some of their explanations fail to account for important caveats.

¶116 For clarity purposes, we point out that there is a difference between a tailing layer initially consolidating, meaning it has hardened but not fully cured, and a layer that has reached final set, meaning it is fully cured. The Court correctly points out this difference, but it accepts without sufficient evidence that the cemented tailings will initially harden and become a non-flowable mass in a matter of days before a new layer of wet tailings is added. Opinion, ¶ 46. DEQ's and Tintina's frequently asserted point that the tailings will consolidate in a matter of days is not fully supported scientifically in the record, as the areas Tintina and DEQ cite to simply have DEQ asserting this point without scientific backing. The Court points to a memo from the project's lead engineer dated September 2, 2016, where the engineer is speaking of the bleed water from the tailings storage facility and states "[t]his bleed water may be noticeable for a few days, until cemented paste tailings are consolidated." This memo is about managing bleed water from tailings and was not meant to assert the timeline for consolidation of the tailings based on concrete data. The DEQ claims that once the tailings initially consolidate, they will become a non-flowable mass. However, the DEQ does not offer any evidence that just because a layer has initially consolidated, then it will be sufficiently stable before additional layers are applied to withstand cracking and disaggregation from the weight of one or multiple additional layers.

¶117 If it takes 28 days for a 2% tailings mixture to reach final set or cure, and new layers will be added on average every 7 to 30 days, then it is possible that three new layers could be added on top of one layer before that layer has actually cured or reached final set. Additionally, the DEQ presented no evidence on how long it takes 0.5% tailings mixtures to cure or reach final set, even though it approved Tintina's use of such. The Court reasons that DEQ did not arbitrarily approve the use of 0.5% tailings because Tintina tested a range consisting of 0% binder, 2% binder, and 4% binder and its expert consultants approved the selected range. Opinion, ¶ 52. While we recognize this range of binder is not without some basis in the record, we still hold concerns about the lower range of binder considering 0% binder was not tested for final set, only 2% and 4% binder were. Only index tests were conducted with 0% binder at varying solids concentrations and only slump measurements were taken, not any data about drying time or final set.

¶118 The slump tests that show low flowability even without binder are complicated by the fact that the test used a higher solids percentage than will ever be used in operations, as the test used between 82 and 84% solids and the tailings in the project will have around 79% solids. The slump test concluded that the optimum solids content for 2% binder was 79.5% but had no conclusions about the optimum amount for 0.5% binder as it was never tested. DEQ admits as much in its brief when it asserts "tailings with higher total solid content may perform just as well, if not better, than tailings with low total solid content and higher binder percentage." While it could be true that tailings with 79% solid content

and a 0.5-2% binder may consolidate in a matter of days, DEQ has failed to show based on record evidence that this is the case.

¶119 DEQ stated in its Final Environmental Impact Statement (FEIS) that "[o]nce [the layer] sets, it would be a non-flowable mass." However, DEQ does not clarify in this instance whether it is referring to the layer reaching final set or merely attaining initial hardening. This distinction is critical and should have been specifically noted by DEQ. Even if a tailings layer initially consolidates after just a few days as DEQ asserts, that does not necessarily mean it will dry to the point of being able to withstand multiple additional layers before the layer fully sets or cures. If a tailing layer does not dry and stabilize to withstand multiple additional layers, it will crack and disaggregate and will not form a non-flowable mass. However, it is unclear whether the tailings will consolidate sufficiently before additional layers are added because the DEQ failed to provide sufficient data on the required dry time. A study of the Bulyanhulu mine, which stores uncemented ultra thickened tailings above ground, confirmed that when tailings were layered without the tailings below fully drying "they became unstable and lost geotechnical and environmental benefits."

¶120 The Court points to evidence of other mines in the record that store tailings in this manner without binder and manage to achieve stability relatively quickly, but this ignores the potential differences between those mines and Tintina's plan authorized by DEQ. Opinion, ¶ 35. As mentioned above, the amount of solids present in the paste is a key factor to stability, and the record does not say what level of solids is present at the few

other mines that have implemented this type of storage. Additionally, the thickness of the layers of paste tailings also significantly affects the drying time, and one of the examples mentioned in the record clarifies that the tailings are deposited in thin lifts of no more than 30 cm to ensure drying and stability before laying fresh tailings. Although DEQ states Tintina plans to deposit the tailings in thin lifts, it does not specify or require a level of thickness which ensures proper drying time. Additionally, although other mines have successfully implemented storing paste tailings aboveground without any binder, the Enviromin study states there were still issues with this storage method such as "over-topping, erosion of paste within the facility (which increases pressure on dams), and potential for static liquefaction accompanied by static or seismic slope instability." While the report goes on to suggest the addition of binder could help alleviate some of the dominant concerns of surface placement of paste tailings, the report admits this has only been partially implemented at one facility to date and the report does not specify the minimum amount of binder that would be necessary to achieve some of these desired effects.

¶121 DEQ notes Tintina will use a variation of binder ratios ranging between 0.5 and 2% depending on operational requirements and tailings properties at the time of pouring. However, the DEQ provides no analysis or explanation on whether using a range of different tailings mixtures will affect the stability of the mass. DEQ chose such low bindings percentages for the CTF "based on the distinct requirements for [the] final placement area." According to DEQ, if a higher percentage mixture, like 4%, was used in

the CTF, it would not be feasible to pump the mixture to the storage facility, thus 0.5-2% was the optimal ratio for pumping. DEQ cites to the tailings management alternatives evaluation conducted by Tintina's working group to support its assertion that a higher percentage of binder would have no environmental benefits, yet the working group evaluated 2% and 4% binder scenarios, never once using as low as 0.5% binder.

¶122 The Court also reasons that Tintina will use a liner and pump system to discharge any water that accumulates in the CTF, there will be an embankment system to contain it, and the safety of these features has not been challenged. Opinion, ¶¶ 38, 51. DEQ asserts this Court "should find that the embankment and HDPE liners (without the cemented tailings) would render the CTF safe and stable," arguing that the cemented tailings are not "necessary" to prevent environmental harm. Yet key components of DEQ's analysis of the safety and stability of the tailings facility depend on the tailings themselves being stable and non-flowable, particularly in face of a possible dam breach or embankment failure, an unlikely but viable threat. DEQ's analysis on the risk of liquefaction in the case of seismic activity depends on the tailings themselves being non-flowable, so the stability and non-flowability of the tailings themselves was essential to DEQ's overall conclusion of the safety and stability of the CTF. The Court and DEQ attempt to deflect concerns about the stability of the tailings themselves by repeatedly pointing out the structural integrity of the liners, embankment, and the additional safety feature of the seepage pumps. While these additional safety measures are important, DEQ's argument that the stability of the tailings themselves is unimportant because of the embankment and liner is undermined by their

assertions that it is critical that the tailings achieve a stable, non-flowable mass. Just because DEQ has additional measures in place that attempt to catch toxic water that comes off the tailings within the CTF does not mean the tailings themselves will form a stable, non-flowable mass sufficient to ensure the safety and stability of the structure.

¶123 This Court held an agency must supply a statement of reasoning why potential impacts of a proposed action are nonsignificant. *Clark Fork I*, ¶ 48. For example, "[a] simple statement that a perpetual discharge of polluted water will always be treated is insufficient to justify a determination that an irreversible discharge is nonsignificant." *Clark Fork I*, ¶ 48. Such a simple basis of reasoning does not meet the "hard look" standard required for MEPA approval. Here, the DEQ did not supply a statement of reasoning for why Tintina did not conduct analysis on 0.5% tailings mixtures (other than because it only had a limited amount of testing opportunities) and how the approved tailing layering was "*sufficient to ensure the safety and stability of the structure*" as required by § 82-4-335(4)(l), MCA.

¶124 Accordingly, the DEQ did not take a hard look at whether this would result in a stable, non-flowable mass. Here, considering the massive volume of tailings to be deposited in the CTF and the risk to human and environmental health should the tailings become unstable, the risk associated with the project is very high.

¶125 DEQ arbitrarily assumed that a 0.5% tailings mixture would be sufficient to create a stable, non-flowable mass without conducting analysis on that ratio. A mere statement that 0.5% tailings will consolidate within days, without supporting evidence that the

tailings will dry sufficiently to support additional layers and withstand cracking or disintegration before reaching final set, is arbitrary and insufficient to justify DEQ's decision. Not only did DEQ act arbitrarily, and thus violate MEPA, when it approved the use of 0.5% tailings mixture in the CTF without conducting any sort of analysis on that tailing's ratio, but it consequently failed to ensure the safety and stability of the CTF and also violated the MMRA. The District Court did not substitute its judgment for DEQ's as the Court asserts. Rather, the District Court merely pointed out that DEQ failed to consider rationally whether the mine tailings mixed with 0.5% binders—which was never studied by Tintina or DEQ—would form and maintain a solid, non-flowable mass. The potential consequences of the tailings being unstable and flowable in the event of an embankment failure are catastrophic and DEQ's failure to require adequate testing undermines their finding that the tailings will be safe and stable.

2. Oxidation: DEQ's analysis failed to properly consider whether oxidation could weaken the stability of the tailings facility.

¶126 Regarding the risk of oxidation, the Court holds DEQ had sufficient evidence to conclude there was low risk for the tailings to oxidize and threaten the stability of the tailings facility. Opinion, ¶ 63. While the Court correctly provides some important context not fully addressed by the District Court, it still allows DEQ too much deference when DEQ failed to account for inconsistencies and extrapolations with its conclusion and the record. DEQ in its technical memorandum explains "[n]ot all cracking is deleterious, as some reaction products simply fill the cracks, retaining hydrologic and even structural

integrity," but the record fails to show when cracking is a cause for concern and when it is not.

¶127 Tintina conducted HCT tests to examine the oxidation of the tailings. Oxidation occurs when the tailings are exposed to air and water, which forms acid that can cause the tailings to deteriorate. Tintina's tests involved humidity weathering cylinders that simulated external forces. Tintina tested tailings with 0%, 2%, and 4% binder. The results showed that oxidation was possible with all variations of cement binder.

¶128 DEQ ignored the test results, asserting that the cylinder testing is more aggressive than what happens in the field, and for that reason it is not truly representative of field conditions. Tintina, however, admitted in its permit application that it "do[es] not have field data for a [CTF] to use and therefore cannot speculate as to how much slower the field rate [of tailings disaggregation] will be" as compared to the weathering test results. As such, Tintina asserted in its permit application that, until field conditions are simulated and show otherwise, the cylinder weathering tests should be assumed to represent the reactivity of the surface placed cemented-paste tailings. Thus, when the CTF is exposed to wetting and drying conditions, like snow and rain, it should be assumed to react similar to the cylinder conditions; however, without data to represent accurate field conditions, DEQ's dismissal of the test results is arbitrary. Further, Tintina's testing showed that after two weeks there was rapid acid generation, and after four weeks, the pH of tailings with 2% cement binder dropped significantly to 3.6, and the cylinders disintegrated. Whereas the 0% binder went acidic immediately in the weathering cylinders.

¶129 Even if the rate of weathering in the cylinders is faster than in the field, DEQ did not take into consideration that Tintina plans on using mostly 0.5% tailings which, presumably, could oxidize faster than the 2% tailings. Until accurate field conditions are simulated, there is no way to get a true estimate.

¶130 Since Tintina did not conduct any analysis on 0.5% binder oxidation, nor whether oxidation itself will affect the stability of the CTF, we cannot agree DEQ took a hard look. Tintina plans on applying new layers of tailings every 7 to 30 days. If the weathering tests Tintina conducted are correct, the tailings will oxidize and the cement in a layer with 2% tailings mixture will start to disintegrate around the 30-day mark if it is exposed to air and water. Nonetheless, the DEQ disregarded the tests and approved Tintina's permit despite this flawed and incomplete testing.

¶131 The Court points to other studies summarized in the Enviromin report that show lack of acidification even with persistent cracking, but other studies from the report that the District Court cited raise concerns about oxygen penetrating beneath the surface and cracking that allows for more oxygen to penetrate and potentially create acidic conditions. Opinion, ¶ 59. Although we do defer to agency expertise in the face of contrary evidence, DEQ has failed to articulate why the potential cracking and oxidation is not a cause for concern in the case of Tintina's proposed mine. DEQ does not cite to any evidence in the record showing why they concluded the cracking would not be deleterious and cause issues. Shortly after the comment about cracking not always endangering structural integrity, DEQ states "the surface cemented tailings would be fully contained within the

CTF basin and require little structural integrity," which directly contradicts the many areas where DEQ and Tintina emphasize the importance of the stability of the paste tailings themselves.

¶132 Additionally, the Court concludes DEQ rationally approved Tintina's proposed method of covering the tailings with a fresh lift every 7 to 30 days based on evidence that other mines have found frequent lifts reduce oxidation, but the Court failed to account for the vast difference between the frequency of the schedule Tintina proposed and the frequency of the example mine relied upon. Opinion, ¶ 59. The Bulyanhulu mine featured in the Enviromin report had applications of lifts every 5 days to prevent oxidation, yet DEQ approved a much larger window. The Court points out the April 2017 Enviromin report suggests covering the tailings with fresh lifts on the scale of weeks rather than days. Opinion ¶ 59. While DEQ is entitled to rely on the recommendation of its expert consultant, we still find this vague timeframe that the tailings could be deposited on the scale of weeks to avoid oxidation not enough to be certain the selected timeframe will minimize oxidation. The Court is correct that we should defer to DEQ's expertise in extrapolating the results from the HCT tests and the Bulyanhulu mine study, but the reliance on the Bulyanhulu mine study and HCT tests is misplaced without further explanation and data. Opinion, ¶ 59.

¶133 The Court explains that Tintina deliberately selected a binder range to allow for flexibility in their operations to better respond to changing conditions on the ground and planned for robust monitoring to ensure its implementation of tailings storage is safe and

stable. Opinion, ¶ 40. The Court accepts that flexibility is necessary for Tintina to respond to on-the-ground conditions and that ongoing monitoring will ensure the adjustments are safe and effective. Opinion, ¶¶ 41-42. While we recognize flexibility is needed, especially with a technology that has never been fully field tested, this cannot be used to excuse obvious gaps in the data that could have been addressed through additional testing or data collection and explanation. It might be true that some of these specifics cannot be fully known until tested in the field, but as much as possible should be discovered upfront even with ongoing monitoring and adjustments. Additionally, since the tailings storage will have layers stacked upon it for years to come, it is important the base layers of the facility are safe and stable or it could compromise the stability of the entire impoundment in the future.

¶134 Without rigorous testing of the potential for oxidation, it was arbitrary for DEQ to conclude Tintina's tailing mixture layering plan ensured the safety and stability of the CTF as required by the MMRA, § 82-4-335(4)(l), MCA.

3. Liquefaction: DEQ's analysis failed to properly consider the potential for liquefaction of the tailings.

¶135 The Court found DEQ had adequately reviewed the issue of liquefaction and come to a reasonable conclusion determining there was no risk of liquefaction despite DEQ failing to account for conflicting evidence in the record and extrapolating from its consultant's conclusions. Opinion, ¶ 71. The Court cites to DEQ's explanations in the record that dewatering and the subsequent low permeability of the paste tailings will preclude any risk of liquefaction, but those cites to the record simply state these facts

without any scientific references. Opinion, ¶ 67. The Court claims the conflicting evidence from studies of other mines is not enough to show DEQ refused to take a hard look and points to differences between the studies and Tintina's proposed mine. Opinion, ¶ 69. However, while we do defer to agency expertise on resolving conflicting evidence, DEQ asserts there will be no risk of liquefaction and then fails to explain in the record why the studies from other mines showing risk for liquefaction are not applicable.

¶136 According to DEQ, "[c]emented paste tailings are a stable, non-flowable (after placement), low-strength solid when consolidated. This precludes the risk of liquefaction or widespread release of tailings in response to impoundment failure or seismic events." Additionally, the DEQ claims:

> The primary benefit of paste deposition in a surface impoundment is that the process extracts much of the water from the tailings and causes the sand and silt particles that comprise tailings to pack together much more tightly than when deposited by water. This causes the material to have a low permeability, which restricts the flow of water and movement of oxygen through the tailings and precludes liquefaction during earthquakes because there is not sufficient water stored between the tailings grains to allow the material to move as a fluid in response to sudden agitation. The low permeability of paste tailings greatly reduces its potential for causing water pollution because very little water can move through the tailings[.]

However, a mere statement that the tailings are not subject to liquefaction because they are a stable mass, or because they have little water content in them, is insufficient without supporting evidence. The DEQ failed to provide any analysis on drying time for the 0.5% tailings mixture, whether the layers must achieve a final set before becoming a stable, non-flowable mass, or whether adding a new layer before a prior layer has reached final set would make the tailings more susceptible to liquefaction.

¶137 It is true the British Columbia mine determined to have liquefaction risk did not use binder for their paste tailings, but Tintina proposes to use 0.5% to 2% binder and does not show or explain that this range of binder will preclude liquefaction. The British Columbia mine uses similar dewatering to make an extra thickened paste with low permeability that DEQ claims should preclude liquefaction and yet DEQ does not point to any difference aside from the addition of binder that would make Tintina's storage facility not prone to liquefaction. Further, the Environmin study stated uncemented paste tailings storage raised issues regarding the potential for liquefaction. DEQ and Tintina fail to account for this especially considering a minimal amount of binder at 0.5% will be most commonly used. Additionally, Tintina mischaracterizes the Neves Corvo Mine study findings claiming they were deposited in ponded water. However, examination of the full study referenced in the record shows only a portion of the 2% binder test ended up in ponded water by accident and that subsequently it suffered a substantial decrease in strength. The study overall points to a need to have at least 1% binder to preclude liquefaction. The Neves Corvo Mine study was conducted on backfill rather than surface tailings, but Tintina and DEQ want the Court to dismiss this study rather than require specific evidence of whether additional pressure increases risk for liquefaction. Data such as this is not contained in the record.

¶138 The Court points to a technical memorandum by DEQ's consultant ERM where ERM evaluated the novel technique of adding binder to surface tailings and found it would increase resistance to seismicity. Opinion, ¶ 67. While the Court is correct this is evidence that adding binder will help with liquefaction concerns and DEQ is entitled to rely on its

expert consultant, the memorandum simply supports the general concept that cemented tailings will be less prone to liquefaction than uncemented tailings. The memorandum does not explicitly analyze Tintina's proposed range of 0.5-2% binder. We find that given this, there was not enough evidence in the record for DEQ to conclude there is no liquefaction risk at all. Neither the ERM memorandum nor other studies referenced show that 0.5% binder is enough to completely preclude any risk of liquefaction. We therefore conclude that DEQ's decision that there was no liquefaction risk was arbitrary and unreasonable.

¶139 DEQ did not take a hard look at whether liquefaction was or was not possible because it did not evaluate the drying time for 0.5% tailings mixtures and assumed it would form a stable mass sufficient to withstand liquefaction. The DEQ conducted analysis for 2 and 4% tailings mixtures, but not 0.5%. Simply stating liquefaction is not possible based on the assumption the tailings have sufficient strength to withstand liquefaction is arbitrary and unreasonable, especially considering DEQ has no evidence to support the conclusion for a 0.5% tailings mixture.

B. Tintina failed to meet the Independent Review Panel (IRP) process requirements of the MMRA.

¶140 The MMRA requires an IRP to review a design document submitted by the applicant. Section 82-4-377(1), MCA. Among other things, the design document must contain a detailed description of the proposed facility and site characteristics, maps and design drawings, and other design specifications. Section 82-4-376(2), MCA. The IRP must review the document and assess the application of technology in the proposed design. Section 82-4-377(8), MCA. The IRP then submits its review and any modifications to the

permit applicant and the DEQ. Section 82-4-377(9), MCA. Then, the engineer of record modifies the document to implement the changes, and the permit applicant sends the final design document to the DEQ. Section 82-4-377(10), MCA.

¶141 The Court affirms that the plain language of MMRA requires an IRP to examine a design document with all required elements listed in § 82-4-376, MCA, yet subsequently finds the IRP reviewed "substantial[ly the] information required by MMRA" despite several required analyses being provided after the IRP issued their report. Opinion, ¶¶ 76-77. The plain language of the MMRA does not support submission of the required elements of the design document in a piecemeal fashion, including documents submitted after the IRP produced its final report in support of the mining permit. Section 82-4-377, MCA. The Court acknowledges the relevant statute does not allow for an applicant to submit a design document missing crucial required information, does not allow the IRP to issue its report absent consideration of all the required information, and does not allow the applicant to submit required information directly to the DEQ without the IRP ever seeing it. Yet, that is essentially what the Court sanctions when it concludes the IRP review was adequate here. Opinion, ¶ 76.

¶142 Here, Tintina submitted its design document to the IRP in July 2017. It did not contain a construction management plan, a completed seismic analysis, or a dam breach risk assessment.

¶143 DEQ argues all the information was submitted, albeit piecemeal, to the IRP prior to its approval, and that should suffice under the MMRA. However, the statute provides the

design document *must* include a construction management plan, a probabilistic and deterministic seismic evaluation for the area, and a dam breach analysis. Sections 84-4-376(m), (n), (s), MCA.

¶144 Here, the design document itself states "[a] site specific construction management plan will be developed for the CTF during the detailed design phase." Tintina and DEQ acknowledge that the required "construction management plan" was never submitted to the IRP but claim all the substantive requirements of the plan can be found in the TOMS manual. However, the TOMS manual was created to comply with the separate TOMS manual requirements of MMRA, not to satisfy the construction management plan. Section 82-4-379, MCA. The Court accepts the TOMS manual as meeting the requirements of the construction management plan; however, this allows for the submission of required materials in a potentially confusing and misleading format. Opinion, ¶ 80. The TOMS manual is generated by a separate statutory requirement from the construction management plan. While there is overlap, each is generated pursuant to separate statutory requirements and purposes. Section 82-4-379, MCA; Section 82-4-376(2)(s), MCA. We have previously held that required information submitted as part of an Environmental Assessment (EA) but organized to fulfill other requirements leads to a confusing and non-cohesive product, thus making it difficult to assess if all the statutory requirements have been met. *Citizens for Resp. Dev. v. Sanders Cnty. Comm.*, 2009 MT 182, ¶ 20, 351 Mont. 40, 208 P.3d 876. We reasoned the "information which could be relevant to the EA is buried in documents created primarily for other purposes" and "much of the relevant

information was not provided in a cohesive format." *Citizens for Responsible Dev.*, ¶¶ 20, 25.

¶145 The case is similar here. While the TOMS manual might fulfill many of the requirements of a construction management plan, Tintina should have prepared a separate construction management plan for the IRP to review to avoid confusion and burying of relevant information.

¶146 While there was "some seismic analysis" reviewed by the IRP, it was not in the design document but in its Waste and Water Management Design for Mine Operating Permit and it did not include the required "probabilistic and deterministic seismic evaluation." Section 82-4-376(m), MCA. A DEQ staff member in a memo dated August 11, 2017, noted the probabilistic and deterministic seismic analyses were not provided to DEQ in any document but that Knight Piésold Consulting indicated those evaluations would be completed soon and distributed. Tintina included the required analysis in its revised design document to DEQ submitted on September 12, 2017, but there is no evidence in the record that the IRP ever reviewed this required analysis directly. By the date of the conference call between Tintina, DEQ, and the IRP that occurred on August 11, this analysis was yet to be completed as indicated in the follow up memo. Even if eventually the IRP was given this required analysis when the revised design document was completed in September, the IRP during the earlier conference call indicated it was satisfied and would not be issuing any additional recommendations although it had never seen the completed seismic analysis. Despite all this, the Court concludes Tintina and DEQ

complied because the analysis was completed and the IRP indicated it was satisfied with Tintina's materials and saw no need to issue further recommendations. Opinion, ¶ 81. The statute is clear, however, the IRP must review this element; Tintina's eventual analysis of the information and subsequent submission to DEQ do not satisfy the requirements of the statute. Section 82-4-377, MCA; Section 82-4-376(m), MCA.

¶147 Tintina did not submit a dam breach analysis until August 11, 2017, at least two weeks after the IRP approved the design document on July 28, 2017. Although the IRP did eventually review the dam breach analysis, it was only after issuing its final report. As the Court stated, it is not logical to allow an applicant to submit a design document with crucial pieces missing and only provide those statutorily required pieces after a final report has been issued by the IRP. Opinion, ¶ 76. Although the Court was satisfied that the IRP did eventually review the dam breach analysis and saw no need to change its recommendation, this ignores the clear statutory requirements an applicant must follow. Additionally, although there is no evidence of it in this case, there is the potential risk that an IRP may become invested in its initial decision and be less willing to consider additional information and change their recommendation after a final report has been issued. Even if a timely review would not have changed the outcome in *this* case, it is unacceptable to excuse clear statutory violations of an environmental review process. In *Citizens for Responsible Development*, we held the Board of Commissioners approval of a subdivision without receiving all the statutorily required EA components was unlawful. *Citizens for Responsible Dev.*, ¶ 25. The approval was reversed based on the EA missing statutorily

required explanations and for the piecemeal format in which much of the information was provided. *Citizens for Responsible Dev.*, ¶ 26.

¶148 While the Court maintains Montana Trout Unlimited (MTU) did not suggest a substantially different outcome might have occurred if the IRP had issued its report after considering all the required materials, we cannot subscribe to the Court's interjection of "harmless error" principles into an environmental statute when the statute is clear. Opinion, ¶ 81. The statutes are designed to ensure that proper procedures and a specific process is followed before an agency issues its decision. "The judiciary's standard remedy for permits or authorizations improperly issued without required procedures is to set them aside." *Park Cnty. Env't Council*, ¶ 55. Tintina and the IRP did not comply with statutory mandates and DEQ should not have allowed this review to unfold in a piecemeal fashion contrary to the clear dictates of the statute. In our opinion, the Court errs when it concludes the result, nevertheless, would be the same. This Court's obligation is to ensure the statutory process, which is designed to produce thorough and well-informed decisions by the agency, is followed. If those statutory processes are followed, it is only then that the agency is entitled to a deferential standard of review.

¶149 ***2. Did DEQ satisfy MEPA when it approved the storage facility's nitrogen discharges into Sheep Creek?***

¶150 Tintina and DEQ's responses that the lagging effluent will not violate the non-degradation limit for total nitrogen once mixed with the surface water are contradicted in the record. DEQ specifically rejected a mixing zone for the effluent into Sheep Creek because the nitrogen levels in the Creek were already at or above the non-degradation limit

during the summer months. DEQ determined Sheep Creek had no assimilative capacity during the summer months to absorb more nitrogen and required Tintina to hold the wastewater from July 1 to September 30. The MPDES permit requires a 0.09 mg/L effluent limitation on total nitrogen, not a limitation on the total nitrogen once it mixes with the surface water. The average estimated total nitrogen coming from the effluent going into Sheep Creek is 0.32 mg/L. It was predicted to reduce to just under 0.12 mg/L only after mixing with the surface water in Sheep Creek. Since there was no mixing zone authorized, the effluent itself must be 0.09 mg/L or under to meet the non-degradation standard.

¶151 The Court holds DEQ's conclusion about the effluent not having a significant impact on Sheep Creek was reasonable and supported by substantial evidence, but DEQ failed to account for the significant and concerning gaps in the record. DEQ failed to identify how much nitrogen would be filtered out prior to the discharged water's entering Sheep Creek. Even if the alluvial sands and wetlands do filter nitrogen, the levels entering Sheep Creek may nonetheless be higher than the 0.09 mg/L limit. The DEQ arbitrarily approved Tintina's permit when it knew that discharged water, containing up to 0.57 mg/L of nitrogen, may enter Sheep Creek during the months of July-September when the limit is 0.09 mg/L.

¶152 Further, the studies relied on by DEQ in responding to comments in the final EIS are about natural wetlands in vastly different environments than Montana, and there is no explanation in the record about why these sources should be applied without modification to the UIGs and alluvial sands. However, in the modeling commissioned by Hydrometrics

for the MPDES permit, Tintina's predictions show the total nitrogen will not be under 0.09 mg/L even after mixing with the water in Sheep's Creek. If DEQ's explanation that attenuation will remove the nitrogen down to below the non-degradation limit is to be believed, then it does not make sense that the water must be withheld during the summer months because it will be above the non-degradation limit. Further, DEQ's assertion that the potential slow rate of infiltration will result in more nitrogen being removed does not account for the infiltration galleries that are directly adjacent to Sheep Creek and would not have much time for attenuation to occur before reaching the Creek. The UIGs will consist of 14 individual infiltration galleries ranging from 150 feet to 350 feet, with the closest being immediately adjacent to the stream and the farthest being approximately 600 feet away. Since Tintina is only instructed to hold the water starting on July 1st and the non-degradation limit is in place also starting July 1, any water released into the galleries immediately near Sheep Creek will have little filtration time before reaching the Creek when the non-degradation limit is in place. DEQ merely asserts wetlands and alluvial sands will lower the nitrogen levels without providing concrete, supporting evidence (other than generally wetlands are known to filter out nitrogen to some degree) to connect the facts to the decision. *See Clark Fork I*, ¶ 48.

¶153 MTU has shown by clear and convincing evidence that contradictory information in the record has not been accounted for by DEQ in a satisfactory manner. Section 75-1-201(6)(a)(i), MCA. While the Court is correct that in the face of conflicting scientific evidence we defer to the agency's expertise, there is a difference between conflicting

evidence and a lack of evidence or unfounded extrapolation. Opinion, ¶ 92. Given the findings related to the mixing zone and the lack of explanation of how to adapt the scientific findings of attenuation to the differing environment of the UIG, we would conclude the District Court was correct in determining DEQ failed to "examine all relevant data and articulate a satisfactory explanation" when DEQ found the effluent discharges would not harm water quality in Sheep Creek. *Clark Fork I*, ¶ 47.

¶154 ***3. Did DEQ meet the requirements of MEPA when it considered alternatives to the proposed project?***

¶155 DEQ screened 13 alternative ideas for the proposed project—12 were dismissed before further analysis was conducted because they did not meet one of the four screening criteria DEQ used. DEQ considered whether the alternative idea: (1) met the project purpose and need, (2) was technically feasible, (3) was economically feasible, and (4) had a significant environmental benefit as compared to the proposed project.

¶156 Under MEPA, an alternative analysis is defined as an "evaluation of different parameters, mitigation measures, or control measures that would accomplish the same objectives as those included in the proposed action by the applicant. For a project that is not a state-sponsored project, it does not include an alternative facility or an alternative to the proposed project itself." Section 75-1-220(1), MCA. DEQ cites to the 2021 MEPA Handbook which refers to a reasonable alternative as one that is practical, technically possible, and economically feasible.

¶157 Here, DEQ eliminated the two alternatives that the District Court thought should be considered and evaluated by merely stating they were not in line with its selective criteria.

Regarding both the *Increased Cement Content in Tailings Alternative* and the *Separate Sulfide Prior to Tailings Disposal Alternative*, DEQ simply stated those alternatives would not provide additional net environmental benefits without conducting enough analysis.

¶158 DEQ's expert, Environmental Resources Management (ERM), wrote a technical memorandum that provided there were some clear environmental advantages to removing pyrite from the tailings. ERM also provided DEQ should take a closer look at the pros and cons of this method rather than just the cost feasibility. While DEQ did conduct further analysis on this option, it stopped short of conducting a full analysis after concluding there would be no net environmental benefit. DEQ's explanation did not meet the hard look standard because after the ERM suggested there are environmental benefits to separating the sulfide, DEQ's examination was shallow, without further research, and lacked citation. Simply stating there would be no net environmental benefits does not meet the hard look standard required by MEPA. Additionally, it is puzzling how DEQ can conclude there would be no net environmental benefits before conducting a full analysis of the alternative. Accordingly, DEQ failed to take an initial hard look at whether either of these two options would be a sufficient alternative on the basis that neither would have a net environmental benefit.

¶159 Ultimately, DEQ did not take the required hard look into the safety and stability of the tailings storge, the IRP review process, and the nitrogen discharges into Sheep Creek. While many aspects of DEQ's review were adequate and the District Court did fail to account for some reasoned explanations, there were still gaps remaining that the Court

overlooks in reversing the District Court's order. We cannot defer to an inadequate analysis unsupported by the record. We would affirm the District Court's determination that DEQ's issuance of the mine permit was arbitrary, capricious, and unlawful, and remand to DEQ.

/S/ INGRID GUSTAFSON
/S/ LAURIE McKINNON