

# Utah Antidegradation Review

## Implementation Guidance

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DRAFT FOR COMMENT

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## DOCUMENT VERSIONS

<u>Version</u>	<u>Date</u>	<u>Summary of Changes</u>
1.0	May 2010	Original document issued.
1.1	May 2012	<ul style="list-style-type: none"> <li>• Minor revisions to original document including some formatting and reorganization.</li> <li>• Added procedures for ranking and weighting POCs.</li> </ul>
2.0	TBD	<ul style="list-style-type: none"> <li>• Added procedures for identifying POCs for discharges to fresh and salt water terminal lakes, and the Great Salt Lake.</li> <li>• Revised flow chart to clarify the submittal and review process (Figure 2).</li> <li>• Revised procedures for ranking and weighting POCs; added assimilative capacity as a factor to consider. Added an example of detailed quantitative procedures for ranking and weighting POCs (Appendix A).</li> <li>• Added requirement that Alternatives Analysis be stamped by a Professional Engineer.</li> <li>• Added procedures for establishing the Baseline Treatment Alternative.</li> <li>• Revised procedures for selecting the least degrading feasible alternative (“preferred alternative”), including consideration of degradation, total cost, cost effectiveness, affordability and other factors. Added an example of detailed quantitative procedures for ranking alternatives (Appendix A).</li> <li>• Developed supplemental spreadsheet tools for ranking and weighting POCs and alternatives.</li> <li>• Added procedures for General Permits.</li> <li>• Added procedures for 401 Water Quality Certifications.</li> <li>• Added Glossary.</li> <li>• Added List of Acronyms.</li> <li>• Added References.</li> </ul>

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# 1 GLOSSARY

2 **ambient condition:** water quality of the receiving water immediately upstream of the point of  
3 discharge

4 **assimilative capacity:** the natural capacity of a water body to dilute and absorb pollutants and  
5 prevent harmful effects (e.g., damage to public health or physical, chemical, biological integrity  
6 of the water)**baseline alternative:** the treatment alternative that meets water quality standards  
7 and water quality based permit effluent limits established by the wasteload analysis

8 **beneficial use:** use of waterbody, including protection and propagation of aquatic wildlife,  
9 recreation, public water supply, and agricultural supply

10 **Blue Ribbon Fishery:** status administered by the Utah Division of Wildlife Resources and the  
11 Blue Ribbon Advisory Council that indicates the waterbody has high quality in the following  
12 attributes: fishing, outdoor experience, fish habitat, and economic benefits

13 **designated use:** beneficial use of waterbody as specified in UAC R317-2-13.

14 **existing use:** beneficial use actually attained in a waterbody on or after November 28, 1975  
15 (UAC R317-1), or use that would be supported by the water quality, regardless of whether or not  
16 they are designated in the water quality standards.

17 **parameter of concern:** a pollutant in the discharge that exceeds or is anticipated to exceed the  
18 ambient concentration in the receiving water

19 **reasonable potential analysis:** statistical analysis to determine whether effluent will have the  
20 reasonable potential to cause an excursion above State water quality standards

21 **sustainability:** the degree that the management method minimizes the depletion or damage to  
22 natural resources

23 **toxic weighting factor:** method to normalize pollutants for differences in toxicity in order to  
24 provide the means to compare mass loadings of different pollutants. EPA derives toxic weighting  
25 factors from chronic aquatic life criteria (or toxic effect levels) and human health criteria (or  
26 toxic effect levels) established for the consumption of fish.

27 **waters of the State of Utah:** all streams, lakes, ponds, marshes, water-courses, waterways,  
28 wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of  
29 water, surface and underground, natural or artificial, public or private, which are contained  
30 within, flow through, or border upon this state or any portion thereof, except that bodies of  
31 water confined to and retained within the limits of private property, and which do not develop  
32 into or constitute a nuisance, or a public health hazard, or a menace to fish and wildlife, shall  
33 not be considered to be "waters of the state" under this definition (Section 19-5-102)

34 **Waters of the United States:** waterbodies subject to the provisions of the Clean Water Act.  
35 Specific waters included under this definition are based on federal agencies' interpretation of  
36 the statute, implementing regulations and relevant caselaw. Refer to EPA for latest guidance on  
37 determination of waters of the US.

38 **ACRONYMS**

ADR	antidegradation review
AFO	animal feeding operation
BMP	best management practice
BPT	best practicable technology
BU	Beneficial use
CAFO	concentrated animal feeding operation
DEQ	Utah Department of Environmental Quality
DMR	discharge monitoring report
DWQ	Utah Division of Water Quality
EPA	United States Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NPV	net present value
POC	parameter of concern
POTW	publically owned treatment works such as water reclamation facilities
SEEI	social, economic and environmental importance
SOP	standard operating procedures
TWF	toxic weighting factor
TWPE	toxic weighting pound equivalents
UAC	Utah Administrative Code
UPDES	Utah Pollution Discharge Elimination System
USACE	United States Army Corp of Engineers
WET	whole effluent toxicity
WLA	wasteload analysis
WQBEL	water quality based effluent limit

39

40 **1.0 INTRODUCTION**

41 The central goals of the Clean Water Act and the Utah Water Quality Act are to  
42 protect, maintain, and restore the quality of Utah’s waters. One way in which this is  
43 accomplished is through Utah’s water quality standards, which consist of: 1) designated  
44 uses (e.g., aquatic life, drinking water, recreation), 2) water quality criteria (both  
45 numeric and narrative), and 3) antidegradation policy and procedures. The intent of the  
46 antidegradation component of our standards is to protect existing in-stream uses and to  
47 maintain high quality waters; those waters that are in better condition than the water  
48 quality standards require. Utah’s antidegradation policy (UAC R317-2-3) provides a  
49 decision making process to ensure that when degradation of water quality is necessary  
50 to accommodate important social and economic development, every feasible option to  
51 minimize degradation is explored. Also, the policy requires that alternative  
52 management options and the environmental and socioeconomic benefits of proposed  
53 projects are made available to concerned stakeholders.

54 This document provides the implementation procedures for Utah’s antidegradation  
55 rules. Utah’s Division of Water Quality (hereafter DWQ) is required by Federal Code (40  
56 CFR §131.12(a)) to develop an antidegradation policy and implementation procedures.  
57 These procedures and associated rules (UAC R317-2-3) meet these requirements. The  
58 implementation procedures discussed in this document were developed in a  
59 collaborative process among stakeholders to identify procedures that would meet the  
60 intent of antidegradation rules, while avoiding unnecessary regulatory burdens.

61 This is the third version of the guidance document. A history of versions and  
62 modifications made to the guidance document can be found in Appendix C. Section 8.0  
63 summarizes the portions of the guidance that still need to be completed.. The absence  
64 of guidance for these topics does not negate or delay the requirements for  
65 antidegradation reviews required under UAC R317-2-3.

66 **1.1 Antidegradation Goals and Objectives**

67 The overarching goal of ADRs is summarized in rule R317.2.3.1 as follows:

68 *“Waters whose existing quality is better than the established standards for the designated*  
69 *uses will be maintained at high quality unless it is determined by the Board, after*  
70 *appropriate intergovernmental coordination and public participation in concert with the*  
71 *Utah continuing planning process, allowing lower water quality is necessary to*  
72 *accommodate important economic or social development in the area in which the waters are*  
73 *located. However, existing instream water uses shall be maintained and protected. No water*  
74 *quality degradation is allowable which would interfere with or become injurious to existing*  
75 *instream water uses.”*

76 Antidegradation reviews (ADRs) are required, as part of the permitting process, for  
77 any action that has the demonstrated potential to degrade water quality. Activities  
78 subject to ADRs include any activities that require a permit or water quality certification  
79 pursuant to federal law. The ADR process involves: 1) classification of surface waters

80 into protection categories, and 2) documenting that activities likely to degrade water  
81 quality are necessary and that all State and Federal procedures have been followed to  
82 ensure that reasonable steps are taken to minimize degradation.

83

## 84 **2.0 ANTIDegradation Protection Categories**

### 85 **2.1 Assigning Protection Categories**

86 Utah's surface waters are assigned to one of three protection categories that are  
87 determined by their existing biological, chemical and physical integrity, and by the  
88 interest of stakeholders in protecting current conditions. Antidegradation procedures  
89 are differentially applied to each of these protection categories on a parameter-by-  
90 parameter basis.

#### 91 *2.1.1 Category 1 Waters*

92 Category 1 waters (as listed in R317-2-12.1) are afforded the highest level of  
93 protection from activities that are likely to degrade water quality. This category is  
94 reserved for waters of exceptional recreational or ecological significance, or that have  
95 other qualities that warrant exceptional protection. Once a waterbody is assigned  
96 Category 1 protection, future discharges of wastewater into these waters are not  
97 permitted. However, permits may be granted for other activities (e.g., road  
98 construction, dam maintenance, pesticide/herbicide application) if it can be shown that  
99 water quality effects will be temporary and that all appropriate Best Management  
100 Practices (BMPs) have been implemented to minimize degradation of these waters.  
101 Discharges that were permitted prior to February 1994, when the rule establishing  
102 Category 1 waters was promulgated, are considered grandfathered.

#### 103 *2.1.2 Category 2 Waters*

104 Category 2 waters (as listed in R317-2-12.2) are also afforded a high level of  
105 protection, but discharges to these waters are permissible, provided no degradation of  
106 water quality will occur or where pollution will result only during the actual construction  
107 activity and where BMPs will be employed to minimize pollution effects. In practice, this  
108 means that all wastewater parameters should be at or below background  
109 concentrations of the receiving water for activities that are not temporary and limited.  
110 As a result of this stipulation, the Level I and Level II ADR provisions discussed in these  
111 implementation procedures are not required for Category 2 waters.

#### 112 *2.1.3 Category 3 Waters*

113 All surface waters of the State are Category 3 waters unless otherwise designated as  
114 Category 1 or 2 in UAC R317-2-12. Discharges that degrade water quality are permitted  
115 for Category 3 waters provided that 1) existing uses are protected, 2) the degradation is  
116 necessary, 3) the activity supports important social or economic development in the  
117 area where the waters are located, and 4) all statutory and regulatory requirements are  
118 met in the area of the discharge. Antidegradation rules also apply for any proposed new  
119 or expanded discharge that is likely to degrade water quality. ADRs require that these  
120 proposed actions demonstrate that such proposed projects are documented as  
121 necessary to accommodate social and economic development, and that all reasonable  
122 alternatives to minimize degradation of water quality have been explored. These

123 implementation procedures provide details about how ADRs are implemented to meet  
124 these requirements.

## 125 **2.2 Procedures for Reassigning Protection Categories**

126 The intent of Category 1 and Category 2 protection classes is to protect high quality  
127 waters. Any person, entity, or DWQ may nominate a surface water to be afforded  
128 Category 1 or 2 protections by submitting a request to the Director of the DWQ DWQ  
129 generally considers nominations during the triennial review of surface water quality  
130 standards. The nominating party has the burden of establishing the basis for  
131 reclassification of surface waters, although DWQ may assist, where feasible, with data  
132 collection and compilation activities.

### 133 *2.2.1 Material to Include with a Reclassification Nomination*

134 The nomination may include a map and description of the surface water; a statement  
135 in support of the nomination, including specific reference to the applicable criteria for  
136 unique water classification, and available, relevant and recent water quality or biological  
137 data. All data should meet the minimum quality assurance requirements used by DWQ  
138 for assessing waters of the State, per the requirements in *Utah Division of Water*  
139 *Quality: Quality Assurance Program Plan for Environmental Data Operations* (DWQ,  
140 2014) and associated Standard Operating Procedures (SOP).

141 It is strongly recommended that a petition for reclassification have the support of the  
142 local water quality planning authority and watershed advisory group.

### 143 *2.2.2 Factors Considered to Increase Protection of Surface Waters*

144 The Water Quality Board may reclassify a waterbody to a more protected category,  
145 following appropriate public comment. Evidence provided to substantiate any of the  
146 following justifications that a waterbody warrants greater protection may be used to  
147 evaluate the request:

- 148 • The location of the surface water with respect to protections already afforded to  
149 waters (e.g. on federal lands such as national parks or national wildlife refuges).
- 150 • The ecological value of the surface water (e.g., biological diversity, or the  
151 presence of threatened, endangered, or endemic species).
- 152 • Water quality superior to other similar waters in surrounding locales.
- 153 • The surface water is of exceptional recreational or ecological significance  
154 because of its unique attributes (e.g., Blue Ribbon Fishery).
- 155 • The surface water is highly aesthetic or important for recreation and tourism.
- 156 • The surface water has significant archeological, cultural, or scientific importance.
- 157 • The surface water provides a special educational opportunity.

- 158       • Any other factors the Board considers relevant as demonstrating the surface  
159       water’s value as a resource.

160       The final reclassification decision will be based on all relevant information submitted  
161       to or developed by DWQ.

### 162   2.2.3 *Factors Considered to Decrease Protection of Surface Waters*

163       The intent of Category 1 and Category 2 protections is to prevent future degradation  
164       of water quality. As a result, downgrades to surface water protection categories are  
165       rare. However, exceptional circumstances may exist where downgrades may be  
166       permitted to accommodate a particular project. For instance, in Utah most surface  
167       waters in the upper portions of National Forests are afforded Category 1 protection,  
168       which may not be appropriate in specific circumstances. Project proponents may  
169       request a classification with lower protection; however, it is their responsibility to  
170       provide sufficient justification. Examples of situations where a reclassification with less  
171       stringent protections might be appropriate are:

- 172       • Failure to complete the project will result in significant and widespread  
173       economic harm.
- 174       • Situations where the surface water was improperly classified as a Category 1 or  
175       Category 2 water because the surface water is not a high quality water (as  
176       defined by the criteria outlined in 2.2.2).
- 177       • Water quality is more threatened by not permitting a discharge (e.g., septic  
178       systems vs. centralized wastewater treatment).

179       Requests for downgrades to protection should provide the most complete and  
180       comprehensive rationale that is feasible. The request for a reduction in protection may  
181       also be considered in concert with the alternatives evaluated through an accompanying  
182       Level II ADR. Proposed projects affecting high quality waters may require more  
183       comprehensive analysis than projects affecting lower quality waters.

### 184   2.2.4 *Public Comment for Proposed Reclassifications*

185       All data and information submitted in support of reclassification will be made part of  
186       the public record. In addition to public comment, the DWQ will hold at least one public  
187       meeting in the area near the nominated water. If the issues related to reclassification  
188       are regional or statewide or of broader public interest, the Division will consider  
189       requests for public meetings in other locations. Comments received during this meeting  
190       will be compiled and considered along with the information submitted with the  
191       nomination.

### 192   2.2.5 *Reclassification Decision Making Process*

193       The final reclassification decision will be based on all relevant information submitted  
194       to or developed by the DWQ. All data will be presented and discussed with the Water  
195       Quality Standards Workgroup. DWQ will then submit its recommendations regarding

196 reclassifications to the Water Quality Board who makes a formal decision about  
197 whether to proceed with rulemaking to reclassify the waterbody. The proposed  
198 reclassification is a rule change, and as such will trigger public notice and comment  
199 procedures.

## 200 **3.0 ANTIDegradation Review General Procedures**

### 201 **3.1 Overview of Antidegradation Review Procedures**

202 ADR reviews for Category 3 waters are conducted at two levels, which are referenced  
203 in R317-2-3 as Level I and Level II reviews.

204 Level I reviews are intended to ensure that proposed actions will not impair “existing  
205 uses”. Level II ADRs assure that degradation is necessary and that the proposed activity  
206 is documented to be economically and socially important. Level II ADRs are required for  
207 any activity that is not temporary and limited in nature and is likely to result in  
208 degradation of water quality. The central tenet of these reviews is to ensure that the  
209 discharge is necessary, water quality standards will not be violated, and that alternatives  
210 to minimize degradation are considered.

211 Antidegradation review procedures for discharges to Category 1 and Category 2  
212 waters are presented in Section 3.4.

#### 213 *3.1.1 Actions Subject to Antidegradation Provisions*

214 Activities subject to ADR requirement include all activities that require a permit or  
215 certification under the Clean Water Act. Special considerations for General Permits,  
216 §401 Certifications, and Stormwater Permits are provided in Section 7.0.

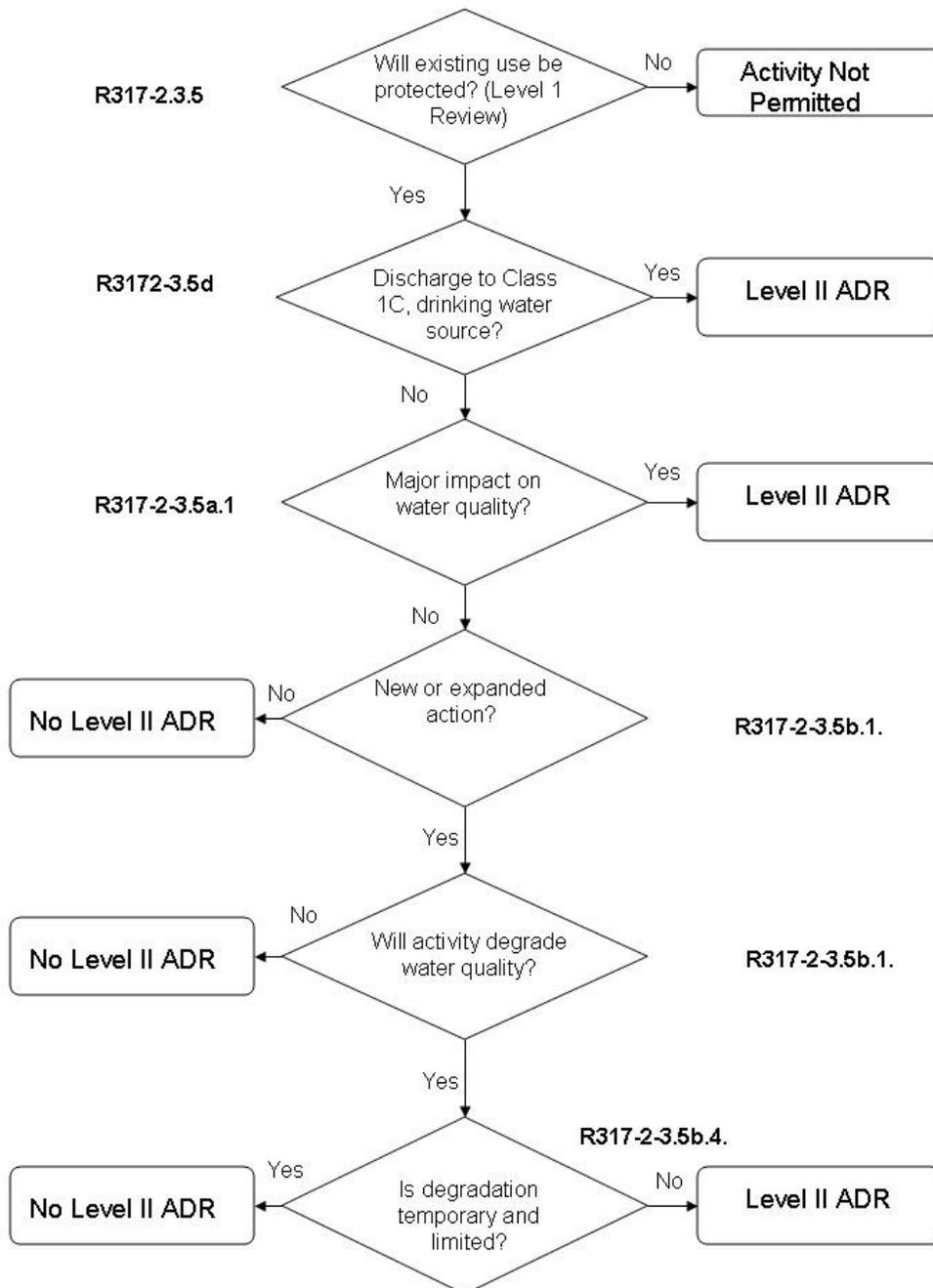
### 217 **3.2 Level I Antidegradation Reviews**

218 Level I reviews are intended to ensure that “existing uses” will be maintained and  
219 protected. Existing uses are defined as any beneficial uses actually attained in a water  
220 body on or after November 28, 1975 (UAC R317-1), or uses that would be supported by  
221 the water quality, regardless of whether they are included in the water quality  
222 standards. For instance, if a stream is currently designated a warm water fishery  
223 (Beneficial Use (BU) Class 3B or 3C), yet it supported a trout fishery (BU Class 3A) at  
224 some point after 1975, the “existing use” criteria would be those for BU Class 3A  
225 (protected for cold water species of game fish and other cold water aquatic life,  
226 including the necessary aquatic organisms in their food chain).

227 Neither State nor Federal regulations allow water quality permits to be issued if the  
228 proposed project will impair an existing instream use. In order to ensure the protection  
229 of existing uses, the Level I review evaluates whether there are existing uses with  
230 protection requirements that are more stringent than the currently designated uses  
231 (R317-2-13).

232 The permit applicant is responsible for submitting sufficient effluent data for DWQ to  
233 adequately conduct the Level I ADR.

234



235  
 236  
 237  
 238  
 239

Figure 1. General process for determining whether a Level II ADR is required for a permit. Expanded actions are increases in loads or concentrations as defined in Section 3.3.1. Special considerations for other permits are discussed in Section 7.0.

240 **3.3 Level II Antidegradation Reviews**

241 A Level II ADR is required if the receiving water is designated with a 1C Drinking Water  
242 Source Use or the Director determines that the discharge may have a major impact on  
243 water quality. Otherwise, all of the following conditions must apply before a Level II  
244 ADR is required for a proposed activity: 1) it must be a new or expanded action, 2) it  
245 must be an action that is regulated by the DWQ, and 3) the action must have a  
246 reasonable likelihood of degrading water quality. Additional details for each of the  
247 preceding requirements are provided below. Figure 1 provides a flow chart to assist  
248 with determining whether a Level II ADR is required.

249 *3.3.1 Activities Considered New or Expanded Actions*

250 New actions refer to facilities that are being proposed for construction, or actions that  
251 are initiated for the first time. Expanded refers to a change in permitted or design  
252 concentration or flow and corresponding pollutant loading. Examples of expanded  
253 actions include:

- 254 • An increase in permitted concentrations;
- 255 • An increase in permitted flow;

256 New or expanded actions could include increases in discharge concentration resulting  
257 from the construction of new or expanded industrial or commercial facilities. In general,  
258 Level II ADRs will be conducted for POTWs based on the design basis of the facility, so  
259 subsequent Level II reviews would typically only occur during facility planning and  
260 design for construction. Periods when treatment systems are being designed,  
261 redesigned, or expanded are often ideal opportunities for implementing new  
262 technologies or evaluating long-term strategies for pollution control. The intent of this  
263 provision is that any POTW capacity expansion would qualify as an action potentially  
264 subject to a Level II ADR.

265 A permit authorizes a facility to discharge pollutants without explicit permit limits as  
266 long as those pollutants are constituents of waste streams, operations, or processes that  
267 were clearly identified during the permit application process, regardless of whether or  
268 not they were specifically identified as present in the facility discharges (see  
269 memorandum from Robert Perciasepe, Assistant Administrator for Water, to Regional  
270 Administrators and Regional Counsels, July 1, 1994, at Pages 2-3). These pollutants are  
271 generally treated the same as pollutants with explicit permit limits with regards to ADRs,  
272 *i.e.*, if a renewing permit maintains the *status quo*, no additional ADR is required.  
273 However, per UAC R317-2-3.5.a.1, the Director may require a Level II ADR for any  
274 project, including renewing permits, if the proposed activity has the potential to cause a  
275 major impact to water quality.

276

277 *3.3.2 Activities Not Considered to Result in Degradation or Additional*  
278 *Degradation*

279 Level II ADRs are not required for projects that are not likely to result in degradation  
280 of the receiving water. Nor are Level II ADRs required for projects when the permit is  
281 being renewed with no increase in permitted flow or concentrations. Permits that are  
282 being renewed met the ADR requirements when the permit was originally issued and  
283 are not required to conduct additional ADRs in the absence of an increase in  
284 degradation. A regulated discharge activity may not be considered to result in  
285 degradation if one or more of the following apply:

- 286 • Water quality will not be further degraded by the proposed activity (R317-2-  
287 3.5.b(1)). Examples include:
  - 288 a. The proposed concentration-based effluent limit is less than or equal to  
289 the ambient concentration in the receiving water during critical  
290 conditions.
  - 291 b. A UPDES permit is being renewed and the proposed effluent  
292 concentration and loading limits are equal to or less than the  
293 concentration and loading limits in the previous permit.
  - 294 c. A UPDES permit is being renewed and new effluent limits are to be  
295 added to the permit, but the new effluent limits are based on  
296 maintaining or improving upon effluent concentrations and loads that  
297 have been observed, including variability.
- 298 • The activity will result in only temporary and limited degradation of water quality  
299 (see Section 3.3.4).
- 300 • Additional treatment is added to an existing discharge and the facility retains  
301 their current permit limits and design capacity.
- 302 • The activity is a thermal discharge that has been approved through a Clean  
303 Water Act §316(a) demonstration.

304 For some parameters, assimilative capacity is used when concentrations in the  
305 discharge are less than ambient concentrations. For instance, if the pH in a discharge is  
306 6 and ambient pH is 7, assimilative capacity for pH will be used and pH may be a  
307 parameter of concern for a Level II ADR.

308 *3.3.3 Activities Considered Temporary and Limited*

309 A Level II ADR may not be required if the Director determines degradation from a  
310 discharge qualifies as temporary and limited following a review of information provided  
311 by the applicant (R317-2-3.5b(3) and (4)). The information provided by applicant should  
312 include:

- 313 • length of time during which water quality will be lowered;
- 314 • percent change in ambient conditions;

- 315 • pollutants affected;
- 316 • likelihood for long-term water quality benefits to the segment (e.g., as may  
317 result from dredging of contaminated sediments);
- 318 • whether fish spawning, or survival and development of aquatic fauna will be  
319 affected (excluding fish removal efforts);
- 320 • degree to which achieving the applicable Water Quality Standards during the  
321 proposed activity may be at risk; and
- 322 • potential for any residual long-term influences on existing uses.

323 U.S. Fish and Wildlife Service and the Utah Division of Wildlife Resources should be  
324 consulted to determine if the timing of the project potentially will affect fish spawning.  
325 Clean Water Act Section 402 General Permits, CWA Section 404 Nationwide and General  
326 Permits, or activities of short duration and limited impact may be deemed to have  
327 temporary and limited effects on water quality. See Section 7.0 for additional detail.

328 The determination of whether an activity is considered temporary and limited will be  
329 made where there is a reasonable factual basis to support such a conclusion. As a  
330 general rule of thumb, temporary means days or months, not years, and covers  
331 activities that lower water quality on a non-permanent basis such as during construction  
332 activities or optimization of a treatment process.

### 333 *3.3.4 Responsibility for Completing Level II ADR Documentation*

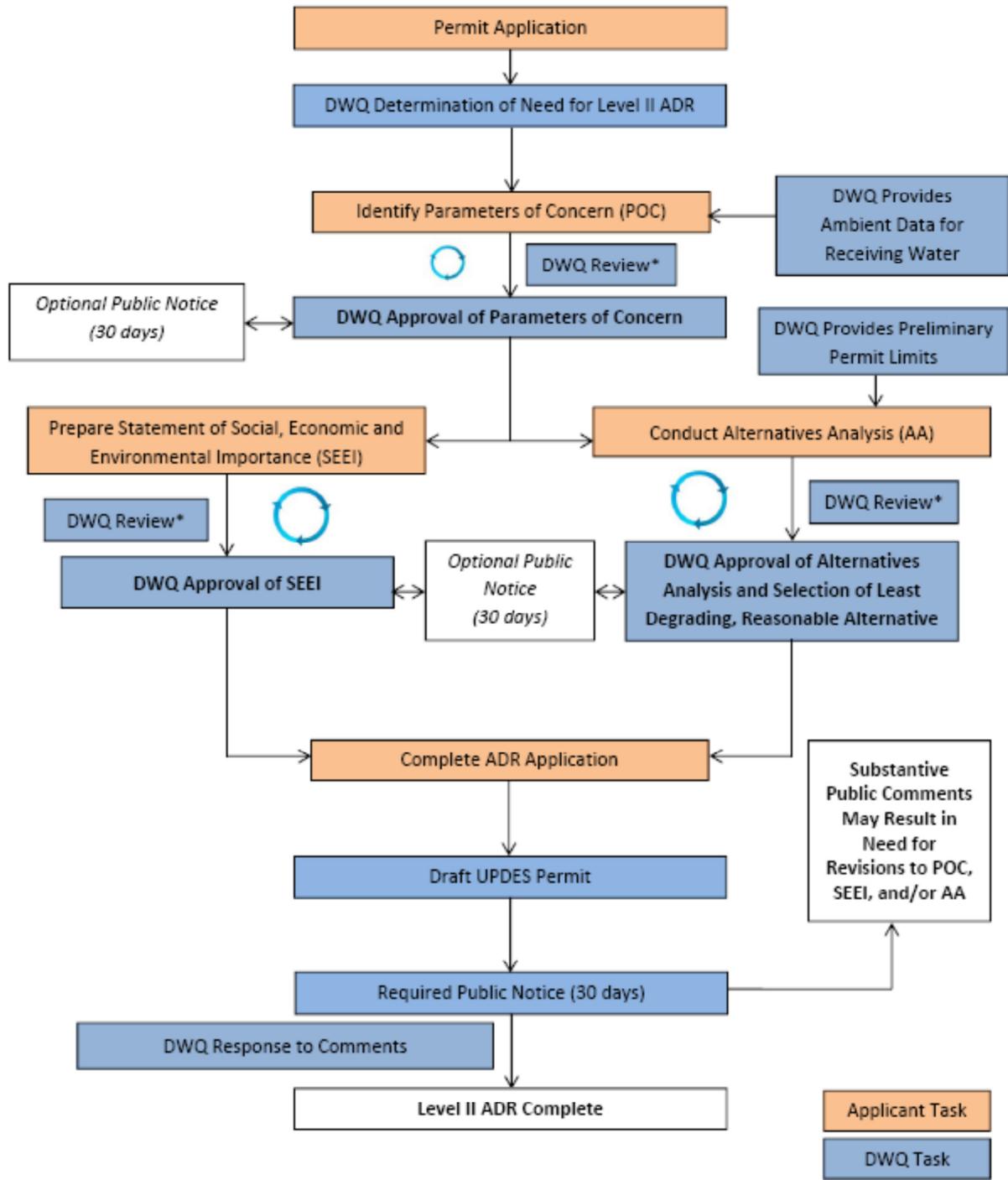
334 Early and frequent communication should occur between applicants and DWQ staff.  
335 The applicant (owner), or owner's representative, is responsible for compiling the  
336 information required for the selection of Parameters of Concern (Section 4.0),  
337 Alternatives Analysis (Section 5.0), and the Statement of Social, Environmental, and  
338 Economic Importance (Section 6.0). The applicant is responsible for recommending the  
339 parameters of concern and the preferred alternative to DWQ. DWQ staff will assist  
340 where possible and provide timely comments to draft material to avoid delays in the  
341 permitting process. Much of this information is prepared for other purposes such as a  
342 Facility Plan. The suggested process for conducting Level II ADRs is shown in Figure 2.

343 For new and expanded discharges, the Alternatives Analysis must be prepared under  
344 the supervision of and stamped by a Professional Engineer registered with the State of  
345 Utah. DWQ may grant an exception from this requirement under certain circumstances,  
346 such as the alternatives considered potentially feasible do not include engineered  
347 treatment alternatives.

### 348 *3.3.5 Timing of Level II ADRs and Interim Submittals*

349 ADR issues should be considered as early in the permitting or design process as  
350 possible. Properly timed Level II ADRs are the most efficient use of time and resources.  
351 For instance, many discharges already consider many of the requirements of Level II  
352 alternative analyses (Section 5.0) while planning for construction of new facilities or

353 upgrades/expansion to existing facilities. Early planning also allows time to develop an  
354 optional work plan which clearly defines a scope of work for developing alternatives.  
355 The work plan minimizes miscommunication between DWQ staff and applicants and  
356 documents decision points critical to the ADR. The work plan may be put out for public  
357 comment, at the applicant's discretion, so that stakeholder concerns can be addressed  
358 early in the process, which is much easier and less time consuming than addressing  
359 concerns at the end of the permitting process. Finally, early notification provides  
360 sufficient time for the DWQ and applicants to work together to ensure that sufficient  
361 data are available to generate defensible permit limits. The DWQ suggests that  
362 whenever possible applicants initiate ADR processes one year or longer prior to the  
363 desired date of a permit. The actual time required to complete the ADR is dependent  
364 on the complexity of the ADR. Figure 2 shows the elements required for completing a  
365 Level II ADR, including interim submittals and agency review.  
366



\* Goal is for one review of 30-day duration per section of ADR. Non-responsive revised submittals may result in additional review cycles.

367  
368

Figure 2. Process for completing a Level II Antidegradation Review (ADR).

369 **3.4 Antidegradation Review of Discharges to Category 1 and 2 Waters**

370 The antidegradation review procedures for discharges to Category 1 and Category 2  
371 waters are as follows:

372 Discharges to Category 1 waters are not allowed, with the following exceptions:

- 373 1. It is demonstrated that the discharge will result in temporary and limited  
374 degradation of the receiving water.
- 375 2. The discharge was permitted prior to February 1994, when the rule  
376 establishing Category 1 waters was promulgated. For these grandfathered  
377 discharges, the Level I ADR procedures presented in Section 3.2 will be  
378 applied. Expansion of grandfathered discharges is not allowed without  
379 reassigning the receiving water to Category 2 or Category 3.

380 Discharges to Category 2 waters are allowed if either of the following is  
381 demonstrated:

- 382 1. The discharge will result in temporary and limited degradation of the receiving  
383 water.
- 384 2. The discharge will not result in degradation of the receiving water.

385 **3.5 Public and Interagency Participation in ADRs**

386 Public participation is a required part of the ADR process. Public notice of  
387 antidegradation review findings, solicitations of public comment and maintenance of  
388 antidegradation review documents as part of the public record help ensure that  
389 interested parties can be engaged and involved throughout the review process. In  
390 addition, intergovernmental coordination and review is required prior to any action that  
391 allows degradation of water quality of a surface water.

392 *3.5.1 Required Public Notification*

393 The completed and signed ADR and associated documentation will be made available  
394 for public comment through the processes required for permits (Figure 2). Typically, the  
395 required public notice will occur with the draft UPDES permit just prior to issuance. For  
396 POTWs that obtain funding from DWQ for construction, the ADR will be public noticed  
397 with the Environmental Assessment document and determination, required by NEPA.

398 DWQ is responsible for responding to comments from the mandatory public comment  
399 period. The applicant may be required to conduct additional evaluation if substantive  
400 comments are received.

401 *3.5.2 Optional Public Notification*

402 The applicant may opt for earlier reviews upon completion of a work plan that defines  
403 the parameters of concern and the alternatives to be considered for the Level II ADR  
404 alternatives analysis. The primary purpose of these optional early reviews is to identify  
405 stakeholder project concerns early in the permitting process when the comments can be

406 addressed most efficiently. If an early review is conducted, concerned members of the  
407 public should use the work plan comment period to identify general concerns with the  
408 proposed activity, additional parameters of concern that warrant consideration, or  
409 additional treatment alternatives that should be considered. Figure 2 identifies decision  
410 points in the process when DWQ may recommend that the applicant solicit optional  
411 public comments.

412 DWQ will facilitate any optional public comment opportunities by making the  
413 documents available on DWQ's website and the State's Public Notice website. For the  
414 optional public comment periods, DWQ can be the recipient of the comments but the  
415 applicant has the responsibility of addressing the comments. A comment response  
416 document is not required, but DWQ recommends that the applicant respond to the  
417 comments in writing. If DWQ is not the recipient of the comments, the applicant should  
418 share the comments received with DWQ in a timely manner. DWQ responds to  
419 comments for the mandatory public comment period prior to issuing the permit.

### 420 *3.5.3 Intergovernmental Coordination and Review*

421 Intergovernmental coordination is required prior to approving a regulated activity  
422 that would degrade a surface water. This coordination will be conducted at a level  
423 deemed appropriate by the Director and will include any governmental agency  
424 requesting involvement with the ADR.

425 **4.0 LEVEL II ADR: PARAMETERS OF CONCERN**

426 Parameters of concern (POC) are evaluated in the Level II ADR. Parameters in the  
427 discharge that exceed, or potentially exceed, ambient concentrations in the receiving  
428 water should be considered in selecting the parameters of concern. POCs should be  
429 identified, ranked and weighted, and submitted to DWQ for review and approval prior  
430 to initiation of the alternatives analysis.

431 **4.1 Determination of the Parameters of Concern**

432 The applicant, working with DWQ, should review all available data, from the discharge  
433 and the receiving water, and prepare a list of parameters that will be evaluated  
434 (potential parameters of concern). DWQ will provide any available data from the  
435 receiving water to the applicant. In cases where effluent or receiving water quality data  
436 does not exist or is limited, the applicant may voluntarily conduct supplementary  
437 sampling and analysis in order to reduce uncertainty associated with identifying POCs.

438 The initial starting point for identifying potential POCs should be the priority  
439 pollutants that are known to be or believed to be present in the effluent, as listed in the  
440 permit application forms (EPA Form 2 [http://www.waterquality.utah.gov/UPDES/  
441 updes\\_f.htm](http://www.waterquality.utah.gov/UPDES/updes_f.htm)). Other parameters may be added or removed depending on the nature of  
442 the proposed project and the characteristics of the receiving water (UAC R317-2-3.5.b).  
443 The following are considerations for selecting parameters of concern:

- 444 1. Is the parameter already included in an existing permit? Parameters with  
445 limits in the discharge permit are generally considered POCs.
- 446 2. Are there any parameters in the effluent, or expected to be in the effluent,  
447 that exceed ambient concentrations in the receiving water?

448 Ambient concentrations are determined by DWQ at critical conditions and  
449 provided to the applicant. Typically, ambient conditions are based on the  
450 most recent 10 years of data. Critical condition for bioaccumulative toxics is  
451 considered the 80<sup>th</sup> percentile concentration and for conventional pollutants  
452 and non-bioaccumulative toxics the average concentration. The applicant  
453 may elect to collect water quality data to reduce uncertainty and assist DWQ  
454 in determining existing ambient concentrations.

455 The effluent concentrations are the permitted effluent limits or discharge  
456 concentration of the baseline treatment alternative. For parameters that do  
457 not warrant permit effluent limits based on DWQ's reasonable potential  
458 analysis, the 80<sup>th</sup> percentile of the effluent concentrations should be used. If  
459 no discharge data are available for the baseline treatment alternative, the  
460 concentration should be estimated based on pilot studies, literature values,  
461 manufacturer's guidelines and/or best professional judgment.

462 In cases when the available data are limited, comparisons between  
463 effluent/permitted and ambient concentrations may be conducted using  
464 methods that minimize type II errors, *i.e.*, erroneously concluding that a  
465 pollutant will not degrade water quality.

466 3. Are there any parameters that are considered to be important by DWQ or  
467 the general public? For instance, nutrients or bioaccumulative compounds  
468 may be of concern for some surface waters. For discharges to Class 1C  
469 drinking water sources, any substances potentially deleterious to human  
470 health may be considered.

471 4. Is the receiving water listed as impaired for any parameters? Parameters for  
472 which the receiving water is listed as impaired and have an ongoing or  
473 approved TMDL are not considered as part of the ADR and are addressed  
474 through the TMDL program.

475 5. Is the discharge of the parameter temporary and limited? Refer to Section  
476 3.3.4 for guidance on what qualifies as temporary and limited. Parameters  
477 that are determined to be temporary and limited are not considered  
478 parameters of concern.

479 6. Is the discharge directly to a terminal lake or adjacent tributary water?  
480 Additional analysis is required to evaluate the degradation and accumulation  
481 of the parameter in the lake environment.

482 7. Is the discharge directly to the Great Salt Lake or adjacent tributary water?  
483 Parameters of concern will be determined on a case-by-case basis utilizing  
484 the best available information regarding ambient conditions and assimilative  
485 capacity.

486 The list of parameters of concern and parameters evaluated but not considered POCs,  
487 including supporting rationale, must be submitted to DWQ. DWQ will review the list  
488 and provide preliminary approval pending public comment.

489 Once the list of parameters of concern has been agreed to between DWQ and the  
490 applicant, the list may be made available to the public by DWQ for an optional comment  
491 period (see Section 3.6.2). After a 30-day comment period, the list may be refined or  
492 approved. This list and associated rankings will form the basis for further activities of  
493 the ADR and will ultimately be used to select the least degrading project alternative  
494 (Section 5).

## 495 **4.2 Ranking and Weighting the Parameters of Concern**

496 If there is more than one parameter of concern, the parameters of concern may need  
497 to be ranked and/or weighted, in order to determine overall water quality degradation  
498 of a given alternative. Since no single objective method is possible, the ranking and

499 weighting of POCs will inherently involve some subjectivity and professional judgment,  
500 and should be developed in close consultation with DWQ. Potential ranking and  
501 weighting factors are provided below. The basis of the ranking and weighting of POCs  
502 shall be justified and documented in the ADR application, and approved prior to  
503 initiating the alternatives analysis. Examples of detailed quantitative ranking and  
504 weighting procedures are provided in Appendix A.

- 505 1. The amount of assimilative capacity available in the receiving water should be  
506 a consideration in determining the relative importance of the parameter in the  
507 discharge. POCs with greater assimilative capacity in the receiving water are  
508 generally considered less important.
- 509 2. For toxic POCs, consideration of the EPA’s toxic weighting factors (TWF) for  
510 ranking and weighting the POCs may be appropriate. EPA derives TWFs from  
511 chronic aquatic life criteria (or toxic effect levels) and human health criteria (or  
512 toxic effect levels) established for the consumption of fish in order to account  
513 for differences in toxicity across pollutants and to provide the means to  
514 compare mass loadings of different pollutants (EPA 2012). Other factors may  
515 be more appropriate for ranking toxic POCs than TWF on a case-by-case basis  
516 depending on site specific considerations such as the available assimilative  
517 capacity for each toxicant or downstream impacts associated with a particular  
518 toxicant. Additional guidance regarding ranking and weighting toxic pollutants  
519 using TWFs is provided in Appendix A.
- 520 3. For non-toxic POCs, ranking and weighting factors should reflect the relative  
521 potential impact of the POC on the beneficial uses of the receiving water. As  
522 this determination involves application of best professional judgment, the  
523 weighting factors will need to be developed in consultation with DWQ. An  
524 example of ranked and weighted non-toxic POCs is provided in Table 4-1.
- 525 4. Other factors to consider include the sensitivity of the receiving water or  
526 downstream waters to the POC and uncertainty associated with the estimated  
527 ambient and/or discharge concentration/load.

528  
529 Table 4-1: Example Ranking and Weighting of Non-Toxic Parameters of Concern

Parameter	Rank	Weight
Total Phosphorus	1	40%
BOD	2	30%
TSS	3	20%
Total Nitrogen	4	10%
		100%

530

### 531 **4.3 Optional Public Notice of the Parameters of Concern**

532 Once the POCs are selected, an optional public comment period may be conducted  
533 (see Section 3.5.2). If no optional reviews are conducted, the public has an opportunity  
534 to comment during the mandatory UPDES public comment period.

535 **5.0 LEVEL II ADR: ALTERNATIVES ANALYSIS**

536 The alternatives analysis requires, to the extent practicable, documentation of the  
537 costs and water quality benefits of alternative effluent management options. The  
538 purpose of the alternatives analysis is to evaluate whether there are any reasonable  
539 non-degrading or less degrading alternatives for the proposed activity.

540 **5.1 Establishing the Baseline Alternative**

541 The Alternatives Analysis requires selecting the baseline alternative, which is defined  
542 as the alternative that meets designated uses and associated criteria through water  
543 quality based permit effluent limits established by the wasteload analysis or TMDL and  
544 any other categorical limits or secondary standards. The cost of the baseline alternative  
545 must be estimated for the purpose of assessing the cost reasonableness of less  
546 degrading alternatives.

547 **5.2 Developing a Scope of Work for Alternatives Analysis**

548 The intent of this section is to outline a collaborative process to define the scope of  
549 work for a Level II review which allows for analysis and document preparation. This step  
550 is critical, as the level of effort for the alternatives analysis will depend on the size and  
551 complexity of the project and the relative importance and sensitivity of the receiving  
552 water.

553 *5.2.1 Collaborative Scoping*

554 The first suggested step in the scoping process will be to convene a meeting between  
555 the applicant, project consultants, and DWQ to identify less degrading alternatives to be  
556 considered and the level of detail appropriate for the alternatives analysis.

557 The requirements for the scope of the alternatives analysis are found in R317-2-3.5:

558 *For proposed UPDES permitted discharges, the following list of alternatives should be*  
559 *considered, evaluated and implemented to the extent feasible:*

- 560 (a) *innovative or alternative treatment options*
- 561 (b) *more effective treatment options or higher treatment levels*
- 562 (c) *connection to other wastewater treatment facilities*
- 563 (d) *process changes or product or raw material substitution*
- 564 (e) *seasonal or controlled discharge options to minimize discharging during critical*  
565 *water quality periods*
- 566 (f) *pollutant trading*
- 567 (g) *water conservation*
- 568 (h) *water recycle and reuse*
- 569 (i) *alternative discharge locations or alternative receiving waters*
- 570 (j) *land application*
- 571 (k) *total containment*
- 572 (l) *improved operation and maintenance of existing treatment systems*
- 573 (m) *other appropriate alternatives...*

574 *5.2.2 General Considerations for Selecting Alternatives for Evaluation*

575 The number of alternatives to be considered and the extent of planning details for  
576 alternative analyses may depend on the nature of the facility, size of the proposed  
577 discharge, the magnitude of degradation, and the characteristics of the receiving water.  
578 This section outlines screening procedures for determining reasonable alternatives that  
579 are appropriately scaled to the proposed project. The alternatives specified here are  
580 guidelines and may be modified from public comments or at the Director's discretion.

581 The following guidelines should be considered when defining the scope of work for  
582 the alternatives analysis:

- 583 1. The feasibility of all alternatives should be examined before inclusion in the  
584 options to be reviewed in more detail. If an option is initially determined not to  
585 be feasible, it does not need to be considered further.
- 586 2. Innovative or alternative treatment options should be limited to proven or  
587 successfully piloted processes.
- 588 3. The treatment options subject to review should focus on those which have the  
589 greatest potential for water quality improvement for the parameters of concern.  
590 Flexibility to modify the treatment process to address potential future changes in  
591 waste streams or treatment requirements should also be considered.
- 592 4. When an instream need for the discharge water is deemed by the Director to be  
593 of significant importance to the beneficial use (i.e., if removal of the discharge  
594 would result in a detrimental loss of stream flow), evaluation of reuse, land  
595 disposal or total containment may be unnecessary.
- 596 5. Alternatives may be ranked in order of potential for parameter reduction.  
597 Preference should be given to processes that have the greatest overall positive  
598 effect on water quality. Typically, these highest ranked processes will have the  
599 greatest reduction in pollutant load and affect the greatest number of  
600 parameters of concern.
- 601 6. Before improved operations and maintenance are considered as a way to  
602 prevent degradation, specific operation or maintenance activities should be  
603 identified. If the Director and the applicant agree, a third party may be used to  
604 assess potential for operations and maintenance improvements.

605 For many projects, the Facility Plan documents the selection of the preferred  
606 treatment option and may be sufficient to meet the alternatives analysis requirement of  
607 the ADR depending on the specific parameters of concern.

608 All discharges requiring a permit must be provided with a level of treatment equal to  
609 or exceeding the requirements in R317-3 for technology based effluent limitations. As  
610 provided in R317-3, minimum technology based treatment requirements for POTWs  
611 consist of secondary treatment and applicable limitations and standards. The

612 technology based review for POTWs in the Clean Water State Revolving Fund (SRF)  
613 process is accomplished through the Facility Plan and Environmental Assessment. The  
614 requirements of the process include an investigation of project need, alternatives,  
615 effluent limitations, future conditions, and an Environmental Assessment. The  
616 technology based review for POTWs subject to the SRF process generally is satisfied on  
617 completion of the Facility Plan, Environmental Assessment, public participation, and  
618 DWQ approval. The technology based review for POTWs that are not in the SRF process  
619 is conducted through the UPDES permitting process.

620 The technology based review for non-POTW facilities likewise is conducted during the  
621 UPDES permitting and technology based requirements and are applied when the permit  
622 is drafted. DWQ has adopted categorical standards for discharges from various types of  
623 industries. Existing industrial discharges are required to achieve the best conventional  
624 pollutant control technology for conventional pollutants and the best available  
625 technology for nonconventional and toxic pollutants. Certain new industrial discharges  
626 are required to comply with new source performance standards based on the best  
627 available demonstrated control technology. Effluent limitations for parameters or  
628 industries not covered by the categorical standards and limitations are established on a  
629 case-by-case basis, based on best professional judgment. The technology review is  
630 complete when the Director approves the draft permit.

631 If a Level II review was conducted for the facility for a previous renewal that was  
632 based on the design basis of the facility and a Level II review is required for permit  
633 reissuance, the applicant should include a written statement certifying that: 1) all  
634 alternative treatment processes remain applicable and that the applicant is not aware of  
635 alternatives that were not previously considered, 2) that reasonable alternative  
636 operation and maintenance procedures are not available that would reduce degradation  
637 of the receiving water if implemented.

### 638 *5.2.3 Finalizing the Alternatives Analysis Scope of Work*

639 Once a scope of work is agreed to between DWQ and the applicant, the applicant may  
640 proceed with completing the alternatives analysis.

641 The applicant may wish to public notice the scope of work for the alternatives  
642 analysis. In this case, the scope of work should be documented in a work plan. The  
643 work plan can be made available to the public and can be published on the State Public  
644 Notice website at the applicant's discretion. This public comment period may be held  
645 concurrent with the comment period for the parameters of concern, both of which are  
646 optional.

647 Additional alternatives may be identified during the public comment period or during  
648 evaluation of the alternatives. These possible changes to the scope of the alternatives  
649 analyses should be reviewed by the applicant and DWQ for inclusion in the work plan, as  
650 needed.

651 **5.3 Procedures for Selecting the Preferred Alternative**

652 The procedures presented in this section are intended to be applied to those  
 653 alternatives that pass initial screening for feasibility. More detailed quantitative ranking  
 654 of alternatives by degradation and cost effectiveness may be required depending on the  
 655 size and complexity of the project and importance and sensitivity of the receiving water.

656 *5.3.1 Ranking of Alternatives by Degradation*

657 The alternatives should be ranked from the least-degrading to the most-degrading  
 658 alternative, as determined from the ranked and weighted pollutants of concern and the  
 659 effectiveness of each alternative. Creating a ranked hierarchy of alternatives helps to  
 660 simplify the applicant’s selection of the least degrading, reasonable alternative.

661 A method for ranking the alternatives suitable for less complex reviews is to  
 662 qualitatively rate the water quality improvement anticipated for each POC under each  
 663 alternative. Below is an example scale for determining the benefit of each alternative  
 664 for the given parameter of concern (Tables 5-1 and 5-2). The applicant may propose  
 665 other qualitative ranking methods as an alternative to the example provided.

666 Table 5-1: Example Water Quality Improvement Ratings

Water Quality Improvement	Rating
Minor Improvement	1
Fair Improvement	2
Good Improvement	3
Excellent Improvement	4
No Degradation	5

667

668 Table 5-2: Example Qualitative Alternative Rankings by Degradation (from least to most)

Alternatives	POC A		POC B		POC C		Weighted Rating	Rank
	Rating	Weight <sup>1</sup>	Rating	Weight <sup>1</sup>	Rating	Weight <sup>1</sup>		
Alternative 4	5	50%	4	30%	4	20%	4.5	1
Alternative 5	3	50%	5	30%	5	20%	4	2
Alternative 2	4	50%	2	30%	3	20%	3.2	3
Alternative 1	2	50%	3	30%	4	20%	2.7	4
Alternative 3	2	50%	3	30%	2	20%	2.3	5

1: Weighting factor from the ranking and weighting of POCs.

669

670 For more detailed reviews, the applicant will need to estimate the mass of each  
 671 parameter removed by each treatment alternative based on the best available  
 672 information. An example of a detailed quantitative ranking and weighting procedure  
 673 that would be appropriate for more complex and detailed analyses is provided in  
 674 Appendix A.

680 5.3.2 Evaluation of Feasibility of Alternatives

681 After ranking the alternatives by degradation, the applicant will need to evaluate  
682 whether it would be reasonable to select a less degrading alternative. The factors that  
683 determine if an alternative is reasonable are cost effectiveness and affordability. Cost  
684 effectiveness and affordability are addressed in the rule (R317-2-3.5.c), which states:

685 *“An option more costly than the cheapest alternative may have to be*  
686 *implemented if a substantial benefit to the stream can be realized. Alternatives*  
687 *would generally be considered feasible where costs are no more than 20% higher*  
688 *than the cost of the discharging alternative, and (for POTWs) where the*  
689 *projected per connection service fees are not greater than 1.4% of MAGI (median*  
690 *adjusted gross household income), the current affordability criterion now being*  
691 *used by the Water Quality Board in the wastewater revolving loan program.*  
692 *Alternatives within these cost ranges should be carefully considered by the*  
693 *discharger. Where State financing is appropriate, a financial assistance package*  
694 *may be influenced by this evaluation, i.e., a less polluting alternative may receive*  
695 *a more favorable funding arrangement in order to make it a more financially*  
696 *attractive alternative.”*

697 Additional guidance on how to evaluate cost effectiveness and affordability are  
698 provided in the sections below.

699 5.3.2.1 Cost Effectiveness

700 An alternative must be cost effective to be considered reasonable. Cost effectiveness  
701 should be evaluated in two ways: overall cost increase and unit cost of pollutant  
702 removal in comparison to the baseline alternative.

703 The total cost increase of each alternative needs to be estimated. The cost estimate is  
704 typically based on a concept level design with limited engineering; sufficient detail in the  
705 cost estimate should be provided so that the basis can be verified. The estimate should  
706 be the Net Present Value (NPV) of the 20-year life-cycle cost including land acquisition,  
707 capital cost, and operation and maintenance (O&M) costs. The applicant shall propose  
708 the discount rate, along with justification, for use in estimating operation and  
709 maintenance costs in current dollars. For upgrades to existing facilities, only the cost  
710 basis for the upgrade should be considered, i.e. additional capital and O&M costs.

711 In some cases, the applicant will be requested to calculate unit costs for pollutant  
712 removal to provide additional information to evaluate the relative cost effectiveness of  
713 each of the treatment alternatives. Refer to Appendix A for detailed procedures for  
714 estimating unit costs.

715 5.3.2.2 Affordability

716 Although a 20% total cost increase is generally considered the threshold for both cost  
717 effectiveness and affordability, the applicant may provide additional information on the  
718 affordability of the less degrading alternative.

719 For public sector discharges, alternatives where the projected per connection service  
720 fees are not greater than 1.4% of the median adjusted gross household income are  
721 generally considered affordable. This is the affordability criterion currently being used  
722 by the Water Quality Board for the wastewater revolving loan program. Secondary  
723 socioeconomic factors that can be considered to evaluate affordability for public-sector  
724 discharges include debt indicators (such as bond rating and overall net debt),  
725 socioeconomic indicators (such as unemployment rate), and financial management  
726 indicators (such as property tax revenue and property tax collection rate).

727 For private sector discharges, the determination of the affordability of less degrading  
728 alternatives will be based on an evaluation of the effect on profitability, liquidity,  
729 solvency and leverage of the entity in comparison to industry benchmarks.

730 Worksheets to assist with the calculation of these economic indicators are available  
731 from EPA (<http://water.epa.gov/scitech/swguidance/standards/economics/>).

#### 732 5.3.2.3 Other Considerations

733 In selecting the preferred alternative, the following additional items should be  
734 considered and evaluated:

735 1. Alternative Operations and Maintenance (O&M) scenarios should be considered  
736 in the ranking process. An Alternative O&M scenario will generally be considered  
737 feasible if the annual cost increase is no more than 10% of the annual operating  
738 cost or 20% of the 20-year NPV, whichever is less.

739 2. In evaluating the feasibility of alternatives, the review should consider the  
740 current zoning for the community surrounding the facility.

741 3. The review of the selected alternative should also include factors such as  
742 reliability, maintainability, operability, sustainability, and adaptability to  
743 potentially changing discharge requirements.

744 Sustainability for the purposes of this evaluation is defined as the degree that  
745 the management method minimizes the depletion or damage to natural  
746 resources.

747 4. When different alternatives have similar potential to reduce degradation of  
748 water quality, other ancillary water quality benefits should be considered such as  
749 maintenance or enhancement of instream flow or habitat.

750 5. Optional mitigation projects may also be included with any selected alternative  
751 when it is deemed to be cost effective and environmentally beneficial. If the  
752 discharger includes a mitigation project with an alternative, consideration should  
753 be given to the expected net benefits to water quality of both the discharge and  
754 mitigations when ranking project alternatives.

755 **5.3.3 *Selecting the Preferred Alternative***

756 Based on all of the factors considered, the applicant will recommend the preferred  
757 alternative to DWQ for review and approval.

758 For DWQ to fairly evaluate alternatives, the following information should be provided  
759 for each alternative process:

- 760 1. A technical description of the treatment process.
- 761 2. Rank alternatives from least degrading to most degrading based on the mass of  
762 pollutants removed.
- 763 3. Evaluation of cost effectiveness, including estimation of total cost and unit cost  
764 for pollutant removal.
- 765 4. Evaluation of affordability, if necessary.
- 766 5. Evaluation of the reliability, maintainability, operability, sustainability, and  
767 adaptability of each alternative.

768 **5.4 Optional Public Notice of the Alternatives Analysis**

769 Once the preferred alternative is selected, an optional public comment period may be  
770 conducted (see Section 3.5.2). If no optional reviews are conducted, the public has an  
771 opportunity to comment during the mandatory UPDES public comment period.

772

773 **6.0 LEVEL II ADR: STATEMENT OF SOCIAL, ENVIRONMENTAL,**  
774 **AND ECONOMIC IMPORTANCE (SEEI)**

775 Beyond the alternatives analysis, the second key component of a Level II ADR is a  
776 Statement of Social, Environmental, and Economic Importance (SEEI). The SEEI  
777 evaluates the societal benefits of the proposed activity by documenting factors such as:  
778 employment, production, tax revenues, housing, and correction of other societal  
779 concerns (i.e., health or environmental concerns). This portion of the ADR provides the  
780 project proponent the opportunity to document that the overall benefits of the project  
781 outweigh any negative consequences to water quality. As a result, the project  
782 proponent is best served by making this portion of the ADR as thorough as possible. At  
783 a minimum this portion of the review should contain the following:

- 784 1. A description of the communities directly affected by the proposed project,  
785 including factors such as: rate of employment, personal or household  
786 income, poverty level, population trends, increasing production, community  
787 tax base, etc.
- 788 2. An estimate of important social and economic benefits that would be  
789 realized by the project, including the number and nature of jobs created and  
790 projected tax revenues generated.
- 791 3. An estimate of any social and economic costs of the project, including any  
792 impacts on commercial or recreational uses.
- 793 4. A description of environmental benefits of the project and associated  
794 mitigation efforts (if any). For instance, if a project would result in an  
795 increase in stream flow that would provide additional habitat and a net  
796 benefit to stream biota, this benefit would be documented in this section of  
797 the review.
- 798 5. Documentation of local government support.

799 As with the Alternatives Analysis portion of the ADR, the size and scope of the SEEI  
800 should be commensurate with the size of the proposed project. The applicant may  
801 reference existing documents that address alternatives such as an Environmental  
802 Assessment or Environmental Impact Statement. Also, it is in the best interest of the  
803 project proponent to make the SEEI as thorough as possible if the project is likely to be  
804 controversial.

805

806 **6.1 Regulatory Framework**

807 The need for SEEs comes from 40 CFR 131.12(a)(2), which states, “Where the quality  
808 of waters exceeds levels necessary to support fish, shellfish, and wildlife and recreation  
809 in and on the water, the quality shall be maintained and protected unless the State  
810 finds, ..., that allowing lower water quality is necessary to accommodate social or  
811 economic development in the area in which the waters are located...” (emphasis added).

812 Accordingly, UAC R317-2-3.5(c)4 specifically calls for SEEI demonstrations:

813 *“Although it is recognized that any activity resulting in a discharge to surface*  
814 *waters will have positive and negative aspects, information must be submitted by*  
815 *the applicant that any discharge or increased discharge will be of economic or*  
816 *social importance in the area.*

817 *The factors addressed in such a demonstration may include, but are not limited*  
818 *to, the following:*

819 *(a) employment (i.e., increasing, maintaining, or avoiding a reduction in*  
820 *employment);*

821 *(b) increased production;*

822 *(c) improved community tax base;*

823 *(d) housing;*

824 *(e) correction of an environmental or public health problem; and*

825 *(f) other information that may be necessary to determine the social and*  
826 *economic importance of the proposed surface water discharge.”*

827

828 **6.2 Important Considerations in Developing SEEs**

829 This section provides guidance for some of the social, environmental, and economic  
830 considerations that the applicant may want to include with the SEI portion of the Level  
831 II ADR. The DWQ anticipates that the specific information provided in the SEI will vary  
832 depending on the nature of the project and the community or communities that will be  
833 affected by the proposed activity. Many of the decisions relating to the social,  
834 environmental, and economic considerations are local in nature and the local  
835 government agencies should be consulted to determine directions that are appropriate.

836 The purpose of the SEI is to demonstrate that the degradation will support important  
837 social, environmental, and economic development in the local area. The SEI is not  
838 about the economic benefits to an individual or corporation. Instead, the SEI is  
839 intended to support an informed public discussion and decision about the pros and cons  
840 of allowing water quality degradation. If the lowering of water quality resulting from  
841 the preferred alternative is not in the overriding public interest, then a non-degrading  
842 alternative must be selected or the permit will be denied. If the lowering of water  
843 quality is found to be in the overriding public interest, this finding is documented and  
844 submitted for public comment along with the draft permit incorporating the preferred  
845 alternative.

846 Following are the factors that should be considered while preparing the SEI:

847 1. Effects on Public Need/Social Services

848 Identify any public services, including social services that will be provided to or  
849 required of the communities in the affected area as a result of the proposed  
850 project. Explain any benefits that will be provided to enhance health/nursing  
851 care, police/fire protection, infrastructure, housing, public education, etc.

852 2. Effects on Public Health/Safety

853 Identify any health and safety services that will be provided to or required of  
854 the communities in the affected area as a result of the proposed project.  
855 Explain any benefits that will be provided to enhance food/drinking water  
856 quality, control disease vectors, or to improve air quality, industrial hygiene,  
857 occupational health or public safety. One example is the construction of a  
858 central treatment plant to correct problems with failing septic systems.  
859 Another example might be removal or additions of toxic or bacteriological  
860 pollutants, which reduce life expectancy and increased illness rates.

861 3. Effect on Quality of Life

862 Describe the impacts of the proposed project on the quality of life for  
863 residents of the affected area with respect to educational, cultural and  
864 recreational opportunities, daily life experience (dust, noise, traffic, etc.) and  
865 aesthetics (viewscape).

866

- 867 4. Effect on Employment
- 868 Explain the impacts of the proposed project on employment practices in the
- 869 affected area. Identify the number and type of jobs projected to be gained or
- 870 lost as a result of the proposed project. Will the proposed project improve
- 871 employment or mean household income in the affected area?
- 872 5. Effect on Tax Revenues
- 873 Explain the impact of the proposed project on tax revenues and local or county
- 874 government expenditures in the affected area. Will the project change
- 875 property values or the tax status of properties? If yes, explain whether that
- 876 change is a beneficial or detrimental to residents/businesses in the affected
- 877 area.
- 878 6. Effect on Tourism
- 879 Discuss the effects the proposed project may have on the economy of the
- 880 affected area by creating new or enhancing existing tourist attractions.
- 881 Conversely, describe any impacts resulting from the elimination of or
- 882 reduction in existing attractions.
- 883 7. Preservation of assimilative capacity
- 884 Review the pros and cons of preserving assimilative capacity for future
- 885 industry and development. Applicants are encouraged to talk with local
- 886 stakeholders such as planning, zoning, and economic development officials
- 887 about their development plans, and should summarize the communities'
- 888 position on utilizing assimilative capacity for the proposed project versus
- 889 future plans or needs.
- 890 8. Other Factors
- 891 Provide any other information that would explain why it is necessary to lower
- 892 water quality to accommodate this proposed project. This category should be
- 893 used to address any social or economic factors not considered above.

### 894 **6.3 Review and Approval of SEEs**

895 Important social, economic or environmental activity refers to an activity that is in the

896 overriding public interest. The Director will generally consider public projects to be

897 necessary to accommodate social and economic growth unless compelling information

898 exists to the contrary. DWQ may consult with local and State planning and zoning

899 agencies to determine whether or not the project is consistent with the long-term plans

900 of affected communities. Information obtained from local planning groups may be

901 compiled with other material obtained through the ADR process. The Director will make

902 a determination. Appeals to the Director's decision may be made consistent with the

903 procedures for administrative appeals.

904 **6.4 Optional Public Notice of the SEEI**

905 At a minimum the SEEI material will be submitted for public comment, along with all  
906 other Level II ADR materials, through the required public comment processes used for  
907 permit applications and renewals. An optional public comment period may be  
908 conducted for the SEEI (refer to Section 3.5.2)

909

910 **7.0 SPECIAL PERMIT CONSIDERATIONS**

911 Most of the implementation procedures discussed in this document are clearly  
912 applicable to UPDES permitting procedures. However, the DWQ also issues other types  
913 of permits, which have special ADR considerations. This portion of the guidance is  
914 incomplete and the reader should contact DWQ for assistance regarding these permits  
915 in the interim.

916 **7.1 Individual Stormwater Permits**

917 This portion of the guidance is incomplete and the reader should contact DWQ for  
918 assistance in the interim. Stormwater permits are subject to an ADR unless the impact  
919 to water quality is temporary and limited.

920 **7.2 General Permits**

921 A number of discharges to surface waters are authorized under general UPDES  
922 permits issued by the DWQ:

- 923 • Concentrated animal feeding operations (CAFO)
- 924 • Concentrated aquatic animal feeding operations
- 925 • Construction dewatering or hydrostatic testing
- 926 • Construction site stormwater
- 927 • Municipal stormwater
- 928 • Industrial stormwater
- 929 • Drinking water treatment plants
- 930 • Private on-site wastewater treatment systems
- 931 • Coal mining operations
- 932 • Discharge of treated groundwater
- 933 • Application of pesticides

934

935 New and reissued General Permits will be reviewed for compliance with  
936 antidegradation provisions as described in this section.

937 Individual regulated activities authorized under General Permits through Notice of  
938 Intent (NOI) procedures are covered under the antidegradation review for the General  
939 Permit and will typically not be required to conduct a Level II ADR. DWQ, after reviewing  
940 the submitted NOI, may require an eligible discharge to undergo a Level II Review if it is  
941 determined that significant degradation may occur as a result of cumulative impacts  
942 from multiple discharges to a water body, as a result of impacts from a single discharger  
943 over time, and/or due to the sensitivity of the receiving water.

944 UPDES General Permits require that discharges authorized under the permit not  
945 violate water quality standards and that best management practices (BMP) contained in  
946 the permit are implemented. Compliance with the terms of the General Permit is  
947 required to maintain authorization to discharge.

948 An antidegradation review will be conducted for the entire class of general permittees  
949 that are authorized under the General Permit. The antidegradation review will consist of  
950 the following items:

- 951 1) *Identify the pollutants that may contribute to water quality degradation.*  
952 The pollutants that are reasonably expected to occur in discharges covered under  
953 the General Permit will be identified. These pollutants will be considered to have  
954 the potential to degrade high quality waters.
- 955 2) *Ensure that existing uses of the receiving waters will be protected.*  
956 The discharge of pollutants must not impair the existing uses of receiving waters.  
957 Methods that may be utilized to demonstrate the protection of existing uses  
958 include the determination of water quality based effluent limits (WQBEL) through  
959 a wasteload analysis, acute and/or chronic whole effluent toxicity (WET) testing,  
960 and implementation of best management practices (BMP) for stormwater and best  
961 practicable technology (BPT) for treatment of process water.
- 962 3) *Documentation and public notice of the antidegradation review.*  
963 The antidegradation review will be documented and public noticed with the draft  
964 General Permit.

965 The level of effort of the antidegradation review will depend on the nature of the  
966 General Permit, the number of dischargers anticipated to fall under the permit, and the  
967 sensitivity of the receiving waters; however, the level of effort will typically be limited  
968 since discharges with a significant potential to degrade water quality are required to  
969 obtain an individual discharge permit.

### 970 **7.3 §401 Water Quality Certifications**

971 The Clean Water Act gives authority to each state to issue a Section 401 Water Quality  
972 Certification (§401 Certification) for any project that needs a Section 404 Permit, NPDES  
973 permit, FERC hydropower license, or other federal permit or license. The §401  
974 Certification is a verification by the state that the project will not violate water quality  
975 standards. The §401 Certification is conducted pursuant to UAC R317-15. DWQ works  
976 with applicants to avoid and minimize impacts to water quality and may require actions  
977 on projects to protect water quality. These required actions are called conditions.

#### 978 **7.3.1 §404 Dredge and Fill Permits**

979 Section 404 of the Clean Water Act regulates the placement of dredged or fill material  
980 into the “waters of the United States.”. The U.S. Army Corps of Engineers (USACE)  
981 administers the §404 permit program dealing with these activities (e.g., wetland fills, in-  
982 stream sand/gravel work, etc.) in cooperation with the EPA and in consultation with  
983 other public agencies. Nationwide general permits are issued for activities with impacts  
984 not deemed to be significant. Individual permits are issued for activities that are  
985 considered to have more than minor adverse impacts. For both individual and  
986 nationwide §404 permits, states have an obligation to certify, certify with conditions, or  
987 not certify §404 permits under §401 of the Clean Water Act. Antidegradation reviews

988 involving the placement of dredged or fill material will be performed via the §401  
989 Certification process.

990 Section 73-3-29 of the Utah Code requires any person, governmental agency, or other  
991 organization wishing to alter the bed or banks of a natural stream to obtain written  
992 authorization from the State Engineer prior to beginning work. The Stream Alteration  
993 Program was implemented in 1972 in order to protect the natural resource value of the  
994 state's streams and protect the water rights and recreational opportunities associated  
995 with them. In 1988, the U.S. Army Corps of Engineers issued Regional General Permit 40  
996 (GP-40) which allows an applicant to obtain both state approval and authorization under  
997 Section 404 of the Clean Water Act through a single application process. Although not all  
998 stream alteration activities qualify for approval under GP-40, many minimal impact  
999 projects can be approved under this joint permit agreement. These activities are subject  
1000 to ADR requirements (R317-2-3.5.a.1.).

1001 Antidegradation and compliance with water quality standards will be addressed and  
1002 implemented through DWQ's §401 Water Quality Certification process. Applicants who  
1003 fulfill the terms and conditions of applicable §404 Permits and the terms and conditions  
1004 of the corresponding §401 Water Quality Certification will have fulfilled the  
1005 antidegradation requirements. Additional antidegradation considerations may be  
1006 incorporated into §404 Permits and the corresponding §401 Water Quality Certifications  
1007 at the time of permit issuance. DWQ will not issue a §401 Water Quality Certification  
1008 where degradation resulting from the project is not necessary to accommodate  
1009 important social, environmental, or economic development.

1010 The decision making process for Individual §404 Permits is contained in the §404(b)(1)  
1011 guidelines (40 CFR Part 230) and contains the elements for a Level I and Level II ADR.  
1012 Prior to issuing a permit under the §404(b)(1) guidelines, USACE must: 1) make a  
1013 determination that the proposed discharges are unavoidable (i.e., necessary); 2)  
1014 examine alternatives to the proposed activity and authorize only the least damaging  
1015 practicable alternative; and 3) require mitigation for all impacts associated with the  
1016 activity. A §404(b)(1) findings document is produced as a result of this procedure and is  
1017 the basis for the permit decision. Public participation is also provided for in this process.  
1018 Level I and Level II ADRs will be met through §401 Water Quality Certification of  
1019 Individual §404 Permits that will typically rely upon the information contained in the  
1020 §404(b)(1) findings document. However, if significant water quality degradation may  
1021 occur as a result of the proposed activity, DWQ will require the applicant to provide  
1022 additional documentation to complete a formal Level II Review.

1023 For activities covered under a Nationwide §404 Permit, the antidegradation review  
1024 will be conducted in conjunction with DWQ's review of the Nationwide Permit for §401  
1025 Water Quality Certification pursuant to UAC R317-15. The antidegradation review for  
1026 Nationwide Permits will be conducted by DWQ similar to the process for UPDES General  
1027 Permits (Section 7.2). For minor activities covered under Nationwide Permits (e.g., road  
1028 culvert installation, utility line activities, bank stabilization, etc.), antidegradation  
1029 requirements will be deemed to be met if all appropriate and reasonable BMPs related

1030 to erosion and sediment control, project stabilization, and prevention of water quality  
1031 degradation are applied and maintained. The §401 Water Quality Certification may  
1032 place additional conditions upon the Nationwide Permit to prevent or minimize water  
1033 quality degradation.

### 1034 *7.3.2 Federal Energy Regulatory Commission Licenses*

1035 The Federal Energy Regulatory Commission (FERC) licenses the operation of dams that  
1036 generate hydroelectric power. Applicants for these licenses are required to obtain §401  
1037 Water Quality Certification. Antidegradation and compliance with water quality  
1038 standards will be addressed and implemented through DWQ's §401 Water Quality  
1039 Certification process. Applicants who fulfill the terms and conditions of an applicable  
1040 FERC license and the terms and conditions of the corresponding §401 Water Quality  
1041 Certification will have fulfilled antidegradation requirements. DEQ will not issue a §401  
1042 Water Quality Certification where degradation resulting from the project is not  
1043 necessary to accommodate important social or economic development. Hydroelectric  
1044 dams affect water quality in the impounded reservoir and in the downstream receiving  
1045 water. The antidegradation review for the water quality certification will focus on the  
1046 degradation in water quality that may result from the construction of the dam and  
1047 operation of the reservoir. DWQ may place conditions on operations or require other  
1048 actions to mitigate the effects on water quality.

1049 As part of the antidegradation review for the §401 Water Quality Certification for a  
1050 FERC License, DWQ will require the applicant to complete a formal Level II Review if  
1051 significant water quality degradation may occur.

1052 When a project undergoes relicensing with FERC, the relicensing certification process  
1053 will compare the water quality under the current FERC license with projected water  
1054 quality in the future under the proposed FERC license. If this comparison shows no  
1055 additional degradation in water quality, then a Level II Review will not be required.

1056

1057 **8.0 FUTURE ITERATIONS OF THE IMPLEMENTATION GUIDANCE**

1058 For the topics listed below in Section 8.1, the guidance is incomplete. The existing  
1059 guidance provided for these topics represents DWQ’s current thinking but is incomplete  
1060 and should be applied with caution. For activities requiring ADRs, but not yet completely  
1061 addressed in guidance, the permittee should consult DWQ for assistance. These ADRs  
1062 will be conducted on a case-by-case basis consistent with the requirements of R317-2-3.

1063 **8.1 Planned Future Additions to the Guidance**

- 1064
- 1065 1. Stormwater Permits. Guidance for municipal, industrial and construction stormwater  
1066 permitting.
  - 1067 2. Pretreatment Program. Guidance for how antidegradation provisions should be applied to  
1068 the pretreatment program.

1069

1070 **REFERENCES**

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1078 Quality, Division of Water Quality.

1079 **APPENDIX A**  
 1080 **EXAMPLE PROCEDURES FOR RANKING AND WEIGHTING**  
 1081 **PARAMETERS OF CONCERN AND ALTERNATIVES**

1082  
 1083 This appendix provides example procedures for ranking and weighting parameters of  
 1084 concern and alternatives that would be appropriate for more complex reviews. Site  
 1085 specific Level II ADRs may vary from this approach.

1086  
 1087 **A-1 Ranking and Weighting Parameters of Concern**

1088 This section provides an example of how to quantitatively rank and weight toxic  
 1089 parameters that may be appropriate for more complex reviews. Example ranking and  
 1090 weighting calculations shown below are provided in the *UDWQ ADR Spreadsheet Tools*  
 1091 that are a companion to this guidance document.

- 1092  
 1093 1. Determine the assimilative capacity of the receiving water for each pollutant.  
 1094 The assimilative capacity is determined by comparing the ambient concentration  
 1095 in the receiving water to the water quality criteria for each pollutant. Ambient  
 1096 concentration is characterized by a summary statistic such as the average or 80<sup>th</sup>  
 1097 percentile value of the data. The water quality criteria can be found in UAC  
 1098 R317-2-14 and may be temperature, pH and/or hardness dependent. An  
 1099 example calculation of the assimilative capacity in the receiving water is shown  
 1100 in Table A-1.

1101  
 1102

Table A-1: Example Assimilative Capacity Determination

Parameter of Concern	Ambient Concentration (mg/L)	Water Quality Criteria (mg/L)	Assimilative Capacity	
			Used <sup>1</sup>	Available <sup>2</sup>
A	0.85	1.25	68%	32%
B	0.06	0.95	6%	94%
C	2.5	5.0	50%	50%

1: Assimilative Capacity Used = (Ambient Concentration/Water Quality Criteria) \* 100  
 2: Assimilative Capacity Available = 100 – Assimilative Capacity Used

- 1103  
 1104 2. Determine the toxic weighting factor for each pollutant.  
 1105 EPA derives TWFs from chronic aquatic life criteria (or toxic effect levels) and  
 1106 human health criteria (or toxic effect levels) established for the consumption of  
 1107 fish in order to account for differences in toxicity across pollutants and to  
 1108 provide the means to compare mass loadings of different pollutants (EPA 2012).  
 1109 EPA considers TWFs appropriate for use in the calculation of cost-effectiveness  
 1110 values because such values only serve as indicators of the relative cost  
 1111 effectiveness of treatment technology options and not as absolute metrics.  
 1112

1113 EPA has calculated TWFs for 1,064 chemicals and the equations and results for  
1114 calculating TWFs are contained in a set of Excel Worksheets known as the TWF  
1115 Database (EPA 2008).

1116  
1117 In addition, the TWFs can be used to calculate toxic weighted pound equivalents  
1118 (TWPE) of pollutant removed as described below.

1119 3. Rank and weight the toxic parameters of concern based on assimilative capacity  
1120 and TWF.

1121 The assimilative capacity used and toxic weighting factor can be multiplied to  
1122 calculate a factor (assimilative capacity-toxic weighting factor) that may be used  
1123 to rank and weight the POCs. An example of ranked and weighted toxic POCs is  
1124 provided in Table A-2.

1125  
1126

Table A-2: Example Ranking and Weighting of Toxic Parameters of Concern

Parameter of Concern	Rank	Assimilative Capacity Used	Toxic Weighting Factor	Assimilative Capacity - Toxic Weighting Factor
A	1	68%	4.04	2.75
B	2	6%	23.10	1.46
C	3	50%	0.63	0.32

1127

1128 **A-2 Ranking Alternatives**

1129 This section provides an example of how to quantitatively rank alternatives for more  
1130 complex reviews. Example ranking and weighting calculations shown below are  
1131 provided in the *UDWQ ADR Spreadsheet Tools* that are a companion to this guidance  
1132 document.

1133 Evaluation of Degradation

1134 For more complex evaluations of alternatives, the ranking of alternatives should be  
1135 based on the development of a matrix giving the weighting of each parameter of  
1136 concern and the mass of pollutant removed by each alternative. The applicant will need  
1137 to estimate the mass of each parameter removed by each treatment alternative based  
1138 on the best available information. Toxic and non-toxic pollutants should be evaluated  
1139 separately.

1140 Example procedures for ranking the alternatives for toxic pollutants are provided  
1141 below:

- 1142 1. Estimate the amount removed of each pollutant for each alternative.

1143 Based on the best available information, estimate the amount of each  
1144 pollutant removed, or not discharged to the receiving water, for each  
1145 alternative. Because toxic pollutants differ in the amount that is considered  
1146 toxic, the reductions in pollutant discharges need to be adjusted for toxicity by  
1147 multiplying the estimated removal quantity for each pollutant by a normalizing  
1148 weight, called a toxic weighting factor (TWF). The TWF for each pollutant  
1149 measures its toxicity relative to copper, with more toxic pollutants having  
1150 higher TWFs. The use of toxic weights allows the removals of different  
1151 pollutants to be expressed on a constant toxicity basis as toxic weighted  
1152 pound-equivalents (TWPE, lb-eq) and summed to yield an aggregate measure  
1153 of the reduction in pollutant discharge that is achieved by a treatment  
1154 alternative (Table A-3).

1155 EPA has calculated TWFs for 1,064 chemicals and the equations and results for  
1156 calculating TWFs are contained in a set of Excel Worksheets known as the TWF  
1157 Database (EPA 2008).

1158

1159 Table A-3: Example Toxic Pollutant Removal Estimation for an Alternative

Toxic Parameter	Influent		Effluent		Removal		Toxic Weighting Factor	TWPE Removal (lb-eq/yr)
	(mg/L)	(lb/day)	(mg/L)	(lb/day)	(lb/yr)	(%)		
Ammonia	1	3.61	0.1	0.36	1,184.3	90%	0.0014	1.7
Arsenic	0.05	0.18	0.005	0.02	59.2	90%	4.04	239.2
Cadmium	0.02	0.07	0.005	0.02	19.7	75%	23.1	456.0
Copper	0.05	0.18	0.005	0.02	59.2	90%	0.63	37.3
Hexavalent chromium	0.05	0.18	0.005	0.02	59.2	90%	0.51	30.2
Iron	0.07	0.25	0.01	0.04	79.0	86%	0.0056	0.4
Lead	0.05	0.18	0.005	0.02	59.2	90%	2.24	132.6
Mercury	0.0001	0.00036	0.0001	0.00036	-	0%	120	0.0
Selenium	0.05	0.18	0.05	0.18	-	0%	1.1	0.0
Silver	0.01	0.04	0.004	0.01	7.9	60%	16.5	130.3
Total chromium	0.05	0.18	0.005	0.02	59.2	90%	0.076	4.5
Total residual chlorine	0.5	1.80	0.01	0.04	644.8	98%	0.509	328.2
Zinc	0.04	0.14	0.005	0.02	46.1	88%	0.047	2.2
Total								1,362.6

1160

1161

2. Rank the alternatives based on total equivalent weight removed.

1162

Using the total toxic weighted pound equivalents removed, rank the alternatives (Table A-4).

1163

1164

Table A-4: Example Alternatives Ranking by Toxic Pollutant Removal

Alternative	Removal (lb-eq/yr)	Rank
Alternative 4	1,333	1
Alternative 5	1,012	2
Alternative 2	957	3
Alternative 3	886	4
Alternative 1	759	5

1165

1166

For non-toxic pollutants such as TSS, BOD, TN, and TP, due to the varying mass of each pollutant observed in the discharge, the amount removed needs to be normalized. The suggested approach is to calculate a unitless removal ratio of pollutant removal for each alternative to the maximum pollutant removal amongst all of the alternatives (Table A-5); however, other normalization methods could be appropriate.

1167

1168

1169

1170

1171 Table A-5: Example Alternatives Ranking by Pollutant Removal for Non-Toxic Pollutants

Alternatives	POC A			POC B			POC C			Weighted Removal Ratio	Rank
	Removal (lb)	Removal Ratio <sup>1</sup>	Weight <sup>2</sup>	Removal (lb)	Removal Ratio <sup>1</sup>	Weight <sup>2</sup>	Removal (lb)	Removal Ratio <sup>1</sup>	Weight <sup>2</sup>		
Alternative 4	15	0.75	50%	15	0.50	30%	20	1.00	20%	0.73	1
Alternative 2	15	0.75	50%	10	0.33	30%	20	1.00	20%	0.68	2
Alternative 3	20	1.00	50%	5	0.17	30%	10	0.50	20%	0.65	3
Alternative 1	10	0.50	50%	20	0.67	30%	15	0.75	20%	0.60	4
Alternative 5	8	0.40	50%	30	1.00	30%	10	0.50	20%	0.60	5
Baseline	10	0.50	50%	8	0.27	30%	15	0.75	20%	0.48	6
Maximum	20			30			20				
<p>1: POC removal normalized to maximum removal of all treatment alternatives, i.e. ratio of removal from alternative to max. removal of all alternatives.</p> <p>2: Weighting factor from the ranking and weighting of POCs.</p>											

1172

1173 Evaluation of Cost Effectiveness

1174 In some cases, the applicant will be requested to calculate unit costs for pollutant  
 1175 removal to provide additional information to evaluate the relative cost effectiveness of  
 1176 each of the treatment alternatives. The unit cost of toxic pollutant removal is calculated  
 1177 using the total cost of the alternative and the equivalent pollutant mass removed that  
 1178 was previously determined (Table A-6).

1179 Table A-6: Example Cost Effectiveness of Alternatives for Toxic Pollutant Removal

Alternative	Total Cost	Total Cost Increase	Pollutant Removal (lb-eq)	Unit Cost (\$/lb-eq/yr)	Unit Cost Increase
Alternative 1	\$1,100	10%	14	\$78.57	-18.3%
Alternative 2	\$1,400	40%	14.5	\$96.55	0.4%
Alternative 3	\$1,300	30%	13.5	\$96.30	0.1%
Alternative 4	\$2,000	100%	16	\$125.00	30.0%
Alternative 5	\$1,500	50%	15	\$100.00	4.0%
Baseline	\$1,000		10.4	\$96.15	

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1181 Since it is not possible to determine an equivalent mass of removal for non-toxic  
 1182 pollutants, the unit cost should be presented for each non-toxic pollutant under each  
 1183 alternative.