NEMASKA LITHIUM INC.

PROJET DE MINE DE SPODUMÈNE WHABOUCHI

MODÉLISATION DE L'EFFLUENT MINIER

DÉCEMBRE 2014

WSP

PROJET DE MINE DE SPODUMÈNE WHABOUCHI

MODÉLISATION DE L'EFFLUENT MINIER

Nemaska Lithium inc.

Rapport

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1 INTRODUCTION

1.1 MISE EN CONTEXTE

La propriété Whabouchi est constituée d'un seul bloc totalisant 33 titres miniers et couvrant une superficie totale d'un peu plus de 1 760 hectares. Tous les titres sont détenus à 100 % par Nemaska Lithium Inc. (ci-après, Nemaska Lithium). Nemaska Lithium propose la construction, l'exploitation et la désaffectation d'une mine à ciel ouvert visant la production d'un concentré de spodumène.

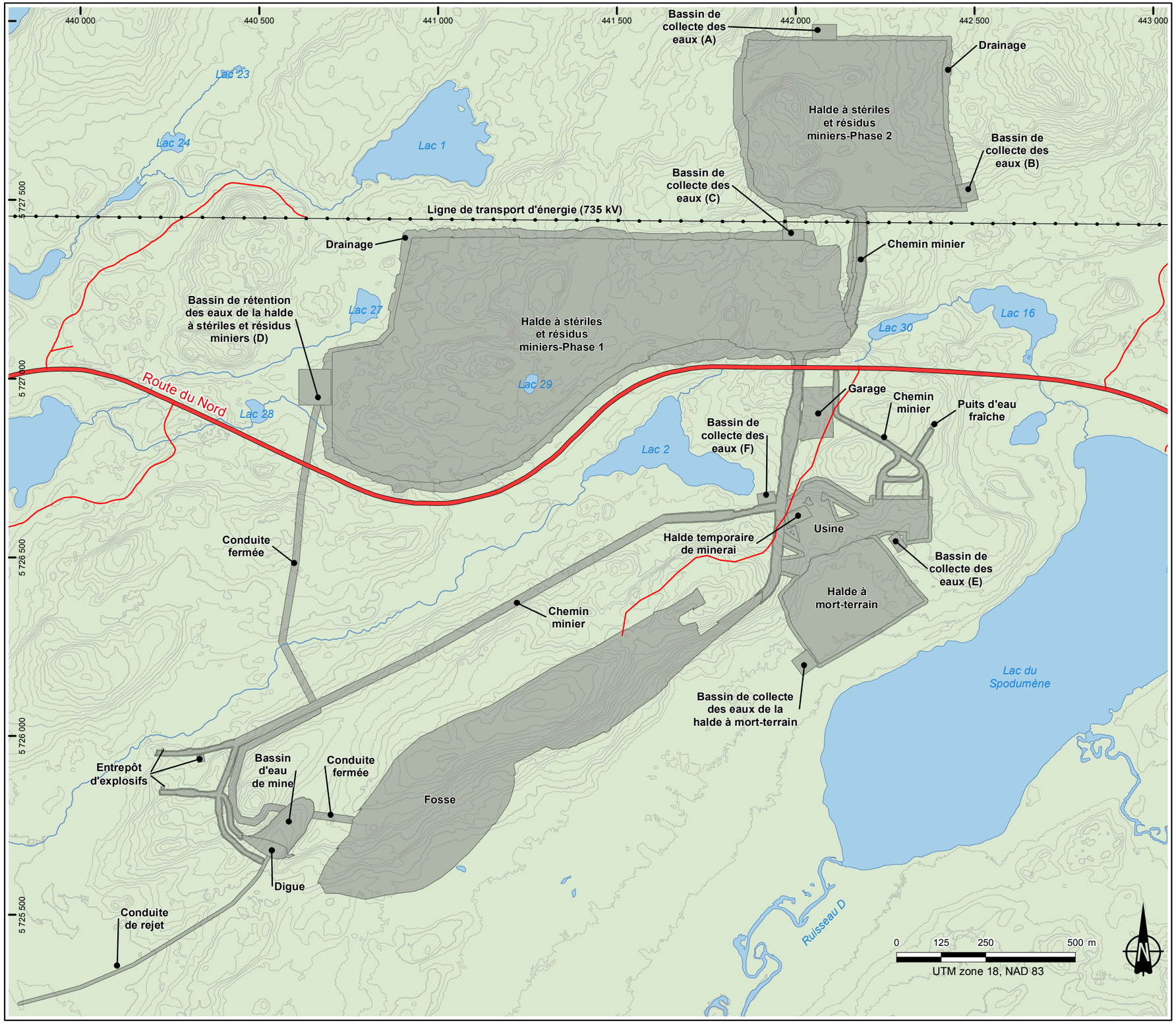
Le projet proposé est localisé à 30 kilomètres à l'est de Nemiscau et à 280 kilomètres au nord de Chibougamau (Carte 1-1). Tel que proposé, le projet comprend l'exploitation d'une fosse à ciel ouvert, une halde de co-disposition des stériles et des résidus miniers, un concentrateur (usine) ainsi que des bâtiments administratifs et d'entretien. La mine permettra de traiter en moyenne 2 775 tonnes de minerai par jour pour une durée de vie de 26 ans.

Dans le cadre des études environnementales relatives au projet Whabouchi, une étude de prédiction de la qualité de l'effluent minier final a été réalisée par Roche (2014a). Selon cette étude, l'effluent minier final respecterait les normes en vigueur prescrites par la Directive 019 sur l'industrie minière et le *Règlement sur les effluents des mines de métaux* (REMM). À la lumière des résultats, aucun dépassement des critères applicables à l'effluent minier n'est anticipé.

De plus, une comparaison, à titre indicatif, des concentrations anticipées à l'effluent final avec les critères applicables au milieu récepteur (lac des Montagnes) a été réalisée par Roche (2014a et 2014b). Pour la grande majorité des paramètres, les concentrations prédites sont inférieures aux critères de toxicité aiguë et/ou de toxicité chronique du ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) ainsi qu'aux recommandations de protection de la vie aquatique du Conseil canadien des ministres de l'Environnement (CCME). Toutefois, certains dépassements de critères ont été observés pour divers paramètres.

Il importe de noter que ces dépassements sont principalement attribuables à des teneurs naturellement élevées dans les eaux de surface et/ou souterraines du secteur. Or, dans tous les cas, et conformément à la méthodologie applicable reconnue par le MDDELCC (MDDEP, 2007), la présence d'une zone de mélange devra permettre le respect des critères applicables, soit ceux de protection de la vie aquatique (chronique et aiguë) du MDDELCC et les recommandations canadiennes du CCME.

La présente étude vise donc à modéliser la zone de mélange contiguë au point de rejet. À l'intérieur de celle-ci, les critères de qualité de l'eau peuvent être dépassés tant qu'il n'y a pas de toxicité aiguë pour les organismes aquatiques ou qu'aucun usage n'est affecté. À la limite de cette zone qui détermine le volume d'eau alloué pour la dilution de l'effluent, les critères de qualité de l'eau s'appliquent.



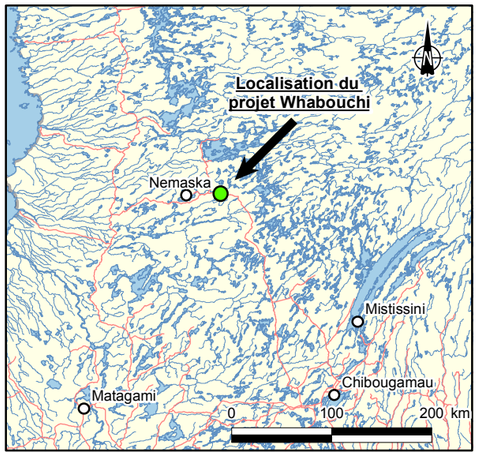
NEMASKA LITHIUM

Infrastructures existantes et projetées

- Route du Nord
- Chemin secondaire
- Infrastructures projetées

Environnement

- Rivière
- Lac



Projet de mine de spodumène Whabouchi

Plan de localisation des infrastructures minières

ROCHE

Date: 2014-12-17
Fichier: 107034_C1-1_infra_mine_141216.mxd
Base cartographique: BNDT, Gouvernement du Canada, 2013

Carte 1.1

Emplacement: P:\pro_fac\107000\107034.001\000\CARTO\Donnees\MXD\Roche\Description_de_projet\107034_C1-1_infra_mine_141216.mxd

1.2 OBJECTIFS

Le premier objectif de la modélisation est d'évaluer les dilutions initiales au voisinage du point de rejet de l'effluent minier. Le deuxième objectif de la modélisation est d'évaluer la longueur de la zone de mélange de l'effluent minier dans le milieu récepteur. Selon le guide Calcul et interprétation des objectifs environnementaux de rejet pour les contaminants du milieu aquatique 1 du ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDEP, 2007), la zone de mélange en lac, en réservoir ou en baie fermée est déterminée par la plus contraignante des limites suivantes :

- Pour tous les contaminants, à l'exception du phosphore et des coliformes fécaux, une longueur correspondant à la distance entre le point de rejet et le point de remontée du panache en surface ; si le panache ne remonte pas en surface, la longueur de la zone de mélange est limitée à la zone présentant les concentrations issues de la dilution initiale (ce qui correspond à la limite de la « near-field region » dans une modélisation);
- Pour tous les contaminants, à l'exception du phosphore et des coliformes fécaux, une dilution estimée par modélisation ne dépassant pas celle qui serait allouée à la décharge du lac en période d'étiage; si elle la dépasse, la dilution à la décharge du lac est alors retenue pour le calcul des objectifs environnementaux de rejet (OER);
- Pour tous les contaminants, à l'exception du phosphore, une dilution maximale de 1 dans 10.

1.3 DESCRIPTION DES INFRASTRUCTURES ET DU PLAN DE GESTION DES EAUX

Dans le cadre de l'étude de faisabilité publiée en juin 2014, un plan de gestion des eaux a été significativement revu et optimisé (Carte 1-2). Ainsi, un seul effluent minier final, au sens de la Directive 019, est prévu à la sortie du bassin d'eau d'exhaure (ou bassin d'eau de mine), lequel sera situé au sud-ouest de la fosse (Carte 1-3).

Ce bassin se déversera dans le lac des Montagnes via une conduite subaquatique (Carte 1-3). Des bassins de collecte (6) seront aménagés aux principaux points bas autour des deux unités (une par phase) composant la halde de co-disposition ainsi qu'autour de l'aire du garage, de l'usine, de la halde de minerai temporaire et de la halde de mort-terrain. Ces bassins récolteront les eaux de ruissellement de ces secteurs; ces derniers étant alimentés par les fossés périphériques qui seront mis en place. Toutes ces eaux seront ultimement acheminées vers un dernier bassin de rétention situé au sud-ouest de la halde.

Depuis l'exutoire de cet ultime bassin, une conduite redirigera les eaux vers le bassin d'eau d'exhaure construit au sud-ouest de la fosse. Celui-ci recueillera aussi les eaux de mine (maintien à sec), c'est-à-dire les eaux souterraines qui s'infiltreront dans la fosse et les eaux de pluie et fonte sur l'empreinte de la fosse. L'exutoire de ce dernier bassin, lequel constituera l'effluent final, sera dirigé via une conduite en surface vers le lac des Montagnes.

Avant d'atteindre la rive, la conduite sera enfouie sur près de 100 m afin de limiter l'impact visuel pour les utilisateurs du lac des Montagnes. Le site de rejet dans le lac se situera près de la rive droite du lac, dans la zone de courant de de la rivière Nemiscau à une profondeur telle qu'elle permettra de favoriser la dispersion de l'effluent. Une conduite totale de près de 4,5 km sera requise. La localisation de l'émissaire a été établie suite à l'analyse des résultats des simulations hydrodynamiques. Elle se situe au droit d'une zone de courant en provenance de l'embouchure de la rivière Nemiscau, ce qui favorise une dilution accrue.

Les eaux de procédé seront entièrement recyclées/recirculées et aucun rejet de ces eaux dans l'environnement n'est prévu. Cette recirculation est rendue possible en raison du mode de gestion des résidus miniers préconisé, lequel vise la production de résidus filtrés non saturés en eau (9 % d'humidité). Une source d'approvisionnement d'appoint (puits d'alimentation en eau fraîche) sera requise pour combler les besoins au concentrateur (mélange des réactifs, étanchéité des pompes). Ces besoins sont estimés à 101,2 m³/h ou 28,1 L/s

Les eaux de ruissellement provenant de l'extérieur du site minier seront déviées afin d'éviter tout contact avec les installations minières. Les eaux ruisselant ailleurs sur le site minier, notamment les chemins d'accès, seront collectées et dirigées vers des bassins de sédimentation, avant leur rejet dans l'environnement, de manière à permettre la déposition préalable des matières en suspension. Le rejet de ces eaux sera réalisé dans le respect des normes d'intervention dans les forêts du domaine de l'État (RNI) et donc vers une zone de végétation localisée à une distance d'au moins 20 m d'un lac ou d'un cours d'eau mesurée à partir de la ligne des hautes eaux (LHE).

Les critères de conception présentés dans la Directive 019 pour le réseau de drainage des aires d'accumulation sans retenue d'eau seront dans tous les cas respectés, c'est-à-dire que des réseaux de collecte des eaux de ruissellement constitués de fossés et bassins ont été conçus de façon à évacuer adéquatement une crue de récurrence 1:100 ans. Une revanche minimale de 1,0 m sera aussi respectée pour toutes les digues ceinturant les bassins.

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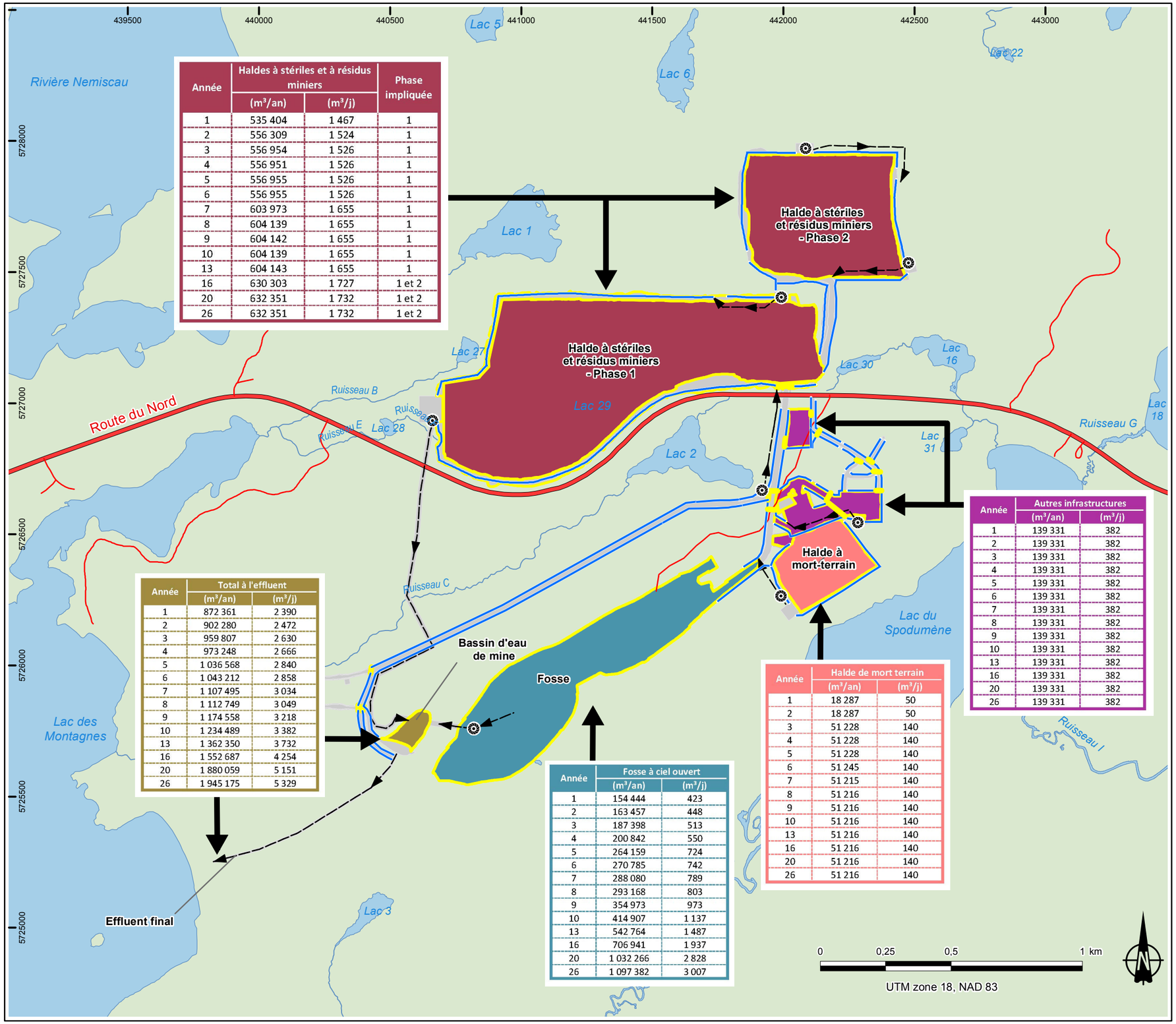


Année	Haldes à stériles et à résidus miniers		Phase impliquée
	(m³/an)	(m³/j)	
1	535 404	1 467	1
2	556 309	1 524	1
3	556 954	1 526	1
4	556 951	1 526	1
5	556 955	1 526	1
6	556 955	1 526	1
7	603 973	1 655	1
8	604 139	1 655	1
9	604 142	1 655	1
10	604 139	1 655	1
13	604 143	1 655	1
16	630 303	1 727	1 et 2
20	632 351	1 732	1 et 2
26	632 351	1 732	1 et 2

Année	Total à l'effluent	
	(m³/an)	(m³/j)
1	872 361	2 390
2	902 280	2 472
3	959 807	2 630
4	973 248	2 666
5	1 036 568	2 840
6	1 043 212	2 858
7	1 107 495	3 034
8	1 112 749	3 049
9	1 174 558	3 218
10	1 234 489	3 382
13	1 362 350	3 732
16	1 552 687	4 254
20	1 880 059	5 151
26	1 945 175	5 329

Année	Fosse à ciel ouvert	
	(m³/an)	(m³/j)
1	154 444	423
2	163 457	448
3	187 398	513
4	200 842	550
5	264 159	724
6	270 785	742
7	288 080	789
8	293 168	803
9	354 973	973
10	414 907	1 137
13	542 764	1 487
16	706 941	1 937
20	1 032 266	2 828
26	1 097 382	3 007

Année	Halde de mort terrain	
	(m³/an)	(m³/j)
1	18 287	50
2	18 287	50
3	51 228	140
4	51 228	140
5	51 228	140
6	51 245	140
7	51 215	140
8	51 216	140
9	51 216	140
10	51 216	140
13	51 216	140
16	51 216	140
20	51 216	140
26	51 216	140

Année	Autres infrastructures	
	(m³/an)	(m³/j)
1	139 331	382
2	139 331	382
3	139 331	382
4	139 331	382
5	139 331	382
6	139 331	382
7	139 331	382
8	139 331	382
9	139 331	382
10	139 331	382
13	139 331	382
16	139 331	382
20	139 331	382
26	139 331	382

NEMASKA LITHIUM

Route du Nord

Chemin forestier

Projet

Pompe

Infrastructure drainée vers le bassin d'eau de mine

Infrastructure projetée (Année 26)

Conduite

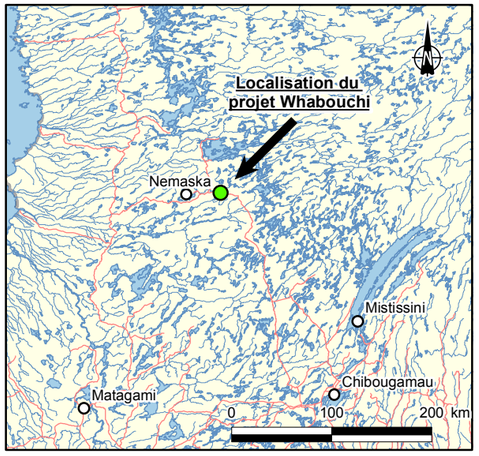
Fossé

Ponceaux

Environnement

Cours d'eau

Plan d'eau



Projet de mine de spodumène Whabouchi

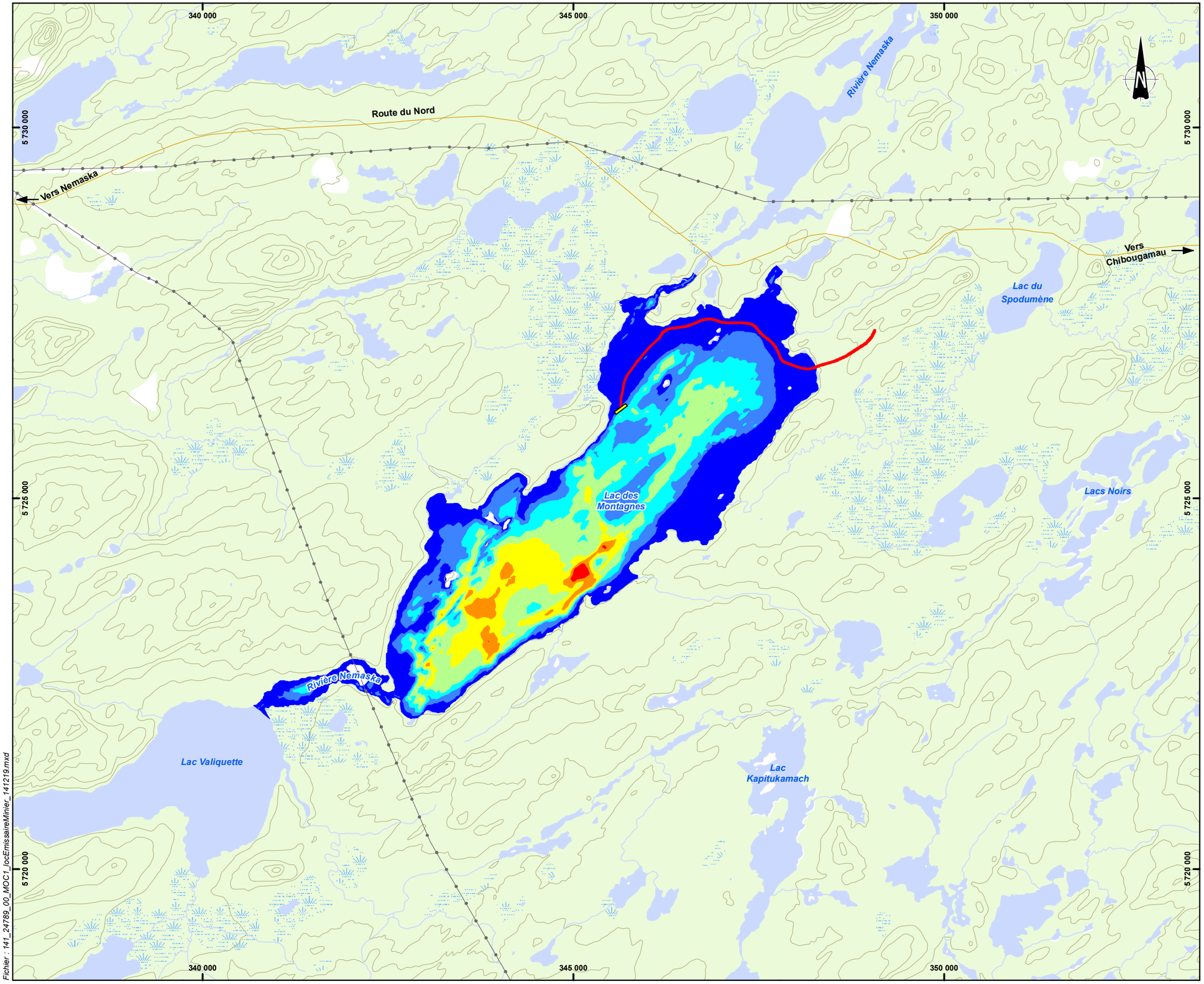
Plan de gestion des eaux – Débit projeté à l'effluent final

ROCHE

Date: 2014-12-17
Fichier: 107034_C1-2_Evol_gestion_eau_141216.mxd
Base cartographique: BNDT, Gouvernement du Canada, 2013

Carte 1.2

Emplacement: P:\pro_fac\107000\107034.001\000\CARTO\Donnees\MXD\Roche\Milieu_physique\Hydrographie\Plan_restauration_Dec_2014\107034_C1-2_Evol_gestion_eau_141216.mxd



Diffuseur

Émissaire minier

Ligne de transport d'énergie

Route

Hydrographie

Étendue d'eau

Cours d'eau

Bathymétrie

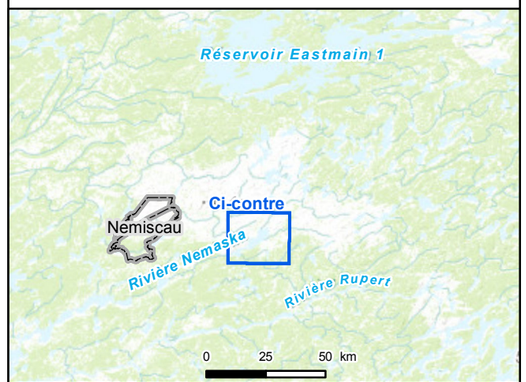
Intervalles de profondeur (m)

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35

0 500 1 000 2 000 m

1 : 50 000

Projection : NAD83, MTM fuseau 9



NEMASKA LITHIUM

PROJET DE MINE DE SPODUMÈNE WHABOUCHI - Modélisation de l'effluent minier

Baie-James, QC

Carte 1.3

Localisation de l'émissaire minier

Sources :

Cartes : - CanVec, RNCAN
- ESRI World topographic Map
Limites de municipalités : SDA20K, 2010-01

Préparée par : V. Métivier
Dessinée par : F.-X. Lafortune
Approuvée par : P. Lafrance

WSP

19 décembre 2014 141-24789-00

Fichier : 141_24789_00_MOC1_locEmissaireMinier_141219.mxd

2 MÉTHODOLOGIE

2.1 APPROCHE DE MODÉLISATION ET D'ANALYSE

Afin d'évaluer l'importance des panaches de dispersion et la dilution de l'effluent minier dans le lac des Montagnes, une approche en trois volets est proposée : le calcul de la dilution limite, une modélisation de la dilution initiale dans la zone de proximité du rejet à l'aide du modèle numérique CORMIX et, finalement, le couplage des résultats obtenus de CORMIX avec la simulation de la diffusion-dispersion latérale des panaches avec le modèle numérique-H2D2 développé à l'INRS-ETE.

Afin d'évaluer la dilution initiale et les dimensions des zones de mélange de l'effluent minier dans le milieu récepteur, une séquence de modélisation en trois phases est proposée :

- Modélisation hydrodynamique bidimensionnelle de la circulation des eaux dans le lac des Montagnes à l'aide du logiciel H2D2;
- Modélisation de la dilution initiale en utilisant le logiciel CORMIX;
- Modélisation de la diffusion-dispersion du panache à l'aide des modules spécialisés du logiciel H2D2.

Cette approche permet d'obtenir les vitesses de courant dans le lac des Montagnes et d'identifier une zone de rejet permettant d'améliorer la dilution. À partir des conditions de courant obtenues au droit du diffuseur, la dilution initiale est évaluée à l'aide du logiciel CORMIX. Ce logiciel permet d'obtenir un taux de dilution dans la zone proximale « *near-field region* » au diffuseur. Enfin, la dilution obtenue à la limite de la zone proximale est introduite dans le modèle H2D2 pour évaluer la dispersion spatiale du panache dans le lac des Montagnes.

Les principales étapes sont décrites dans les sections suivantes.

2.1.1 DILUTION LIMITE

Lorsque le débit de l'effluent est faible par rapport au débit ambiant et que la concentration des apports du milieu est nulle, le rapport entre le débit ambiant et le débit de l'effluent, défini comme étant la dilution limite, permet d'évaluer la capacité de dilution du milieu. Elle représente la dilution qui serait obtenue si l'effluent traité était mélangé uniquement à l'apport en eaux propres, et ce, au point de rejet. Cette estimation est comparée aux résultats des modèles numériques utilisés dans le cadre des projets.

La dilution limite pour l'effluent minier traité a été établie en calculant le rapport entre le débit ambiant (débit en provenance de la rivière Nemiscau) et le débit de l'effluent minier.

2.1.2 MODÉLISATION CORMIX

La version 8.0GT du modèle numérique Cornell Mixing Zone Expert System (CORMIX) a été utilisée afin de calculer la dilution initiale à proximité de la localisation de l'émissaire et la longueur de mélange. Le développement de ce modèle a été financé en partie par l'Agence américaine de protection de l'environnement (U.S. Environmental Protection Agency) (Doneker et al., 2007). Enfin, ce modèle est recommandé par le ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) (MDDEP, 2007).

La modélisation du rejet d'un émissaire en milieu lacustre s'avère complexe en raison des contraintes des vitesses d'écoulement. Dans le cas du lac des Montagnes, la morphologie de ce dernier se traduit par de faibles vitesses d'écoulement sur une grande superficie du lac, de sorte que la géométrie et la localisation de l'émissaire s'avèrent des éléments qui influencent de façon significative la dilution initiale de l'effluent dans le milieu récepteur.

Il est à noter que les résultats obtenus sont spécifiques aux prémisses considérées pour la modélisation. Des conditions différentes sont susceptibles d'engendrer des résultats et des conclusions différents de ceux qui sont présentés.

2.1.3 MODÉLISATION H2D2

Le modèle H2D2 est un logiciel qui a été développé à l'Institut national de la recherche scientifique, section Eau-Terre-Environnement (INRS-ETE). Il constitue la continuité des logiciels Hydrosim. Le modèle permet de résoudre les équations de St-Venant ainsi que les équations d'advection-diffusion. Il permet également de simuler les conditions hydrodynamiques qui prévalent dans le lac des Montagnes pour différentes conditions de débit et de niveau d'eau. Les conditions hydrodynamiques sont simulées en régime permanent permettant ensuite de modéliser la dilution de la zone de mélange passive « far field ». Il est donc utilisé en complément au modèle CORMIX.

2.2 RELEVÉS RÉALISÉS SUR LE TERRAIN

Des mesures des conditions météorologiques et des conditions hydrodynamiques ont été réalisées afin de caractériser le milieu récepteur. En particulier, des mesures de niveaux d'eau, de débits, de température de l'eau et de courantométrie ont été réalisées (Environnement Illimité, 2014) pour caractériser les conditions hydrodynamiques entre les mois de mai et octobre 2014. Enfin, les conditions météorologiques ont été mesurées pour la période comprise entre le 26 mai et le 5 octobre 2014.

Les détails de l'ensemble des relevés et des résultats des mesures de terrain sont présentés dans le rapport d'Environnement Illimité (2014).

2.2.1 CONDITIONS MÉTÉOROLOGIQUES

Au cours de la période de mesures, la température de l'air a varié entre -3 et 32°C. La vitesse du vent a dépassé les 40 km/h à quelques reprises pour atteindre une pointe à 46 km/h (Figure 2-1).

2.2.2 CONDITIONS HYDROLOGIQUES

Les débits évalués en amont du lac ont fluctué entre 26 m^3/s (11 septembre) et 102,5 m^3/s (21 mai) (Figure 2-1). Il est estimé que le débit du tributaire en rive gauche a varié entre 0,69 et 4,3 m^3/s. Les niveaux d'eau mesurés en aval du lac ont généralement fluctué entre 273 et 273,93 m.

2.2.3 TEMPÉRATURE DE L'EAU

Une évolution marquée de la température de l'eau est observée dans le lac des Montagnes durant l'été 2014 (Figures 2-2 et 2-3). À la fin du mois de mai, la température de l'eau au fond du lac est à une température d'environ 4°C et en surface elle est de l'ordre de 6°C (Figures 2-2 et 2-3). Plus tard, la différence entre la température de l'eau en surface et celle au fond s'accroît. À l'été, les profils de température montrent une stratification du lac et une thermocline à une profondeur d'environ 11 à 15 m. À l'automne, le profil de température est essentiellement uniforme, de sorte qu'au début du mois d'octobre la température de l'eau atteint 10°C sur l'ensemble de la colonne d'eau.

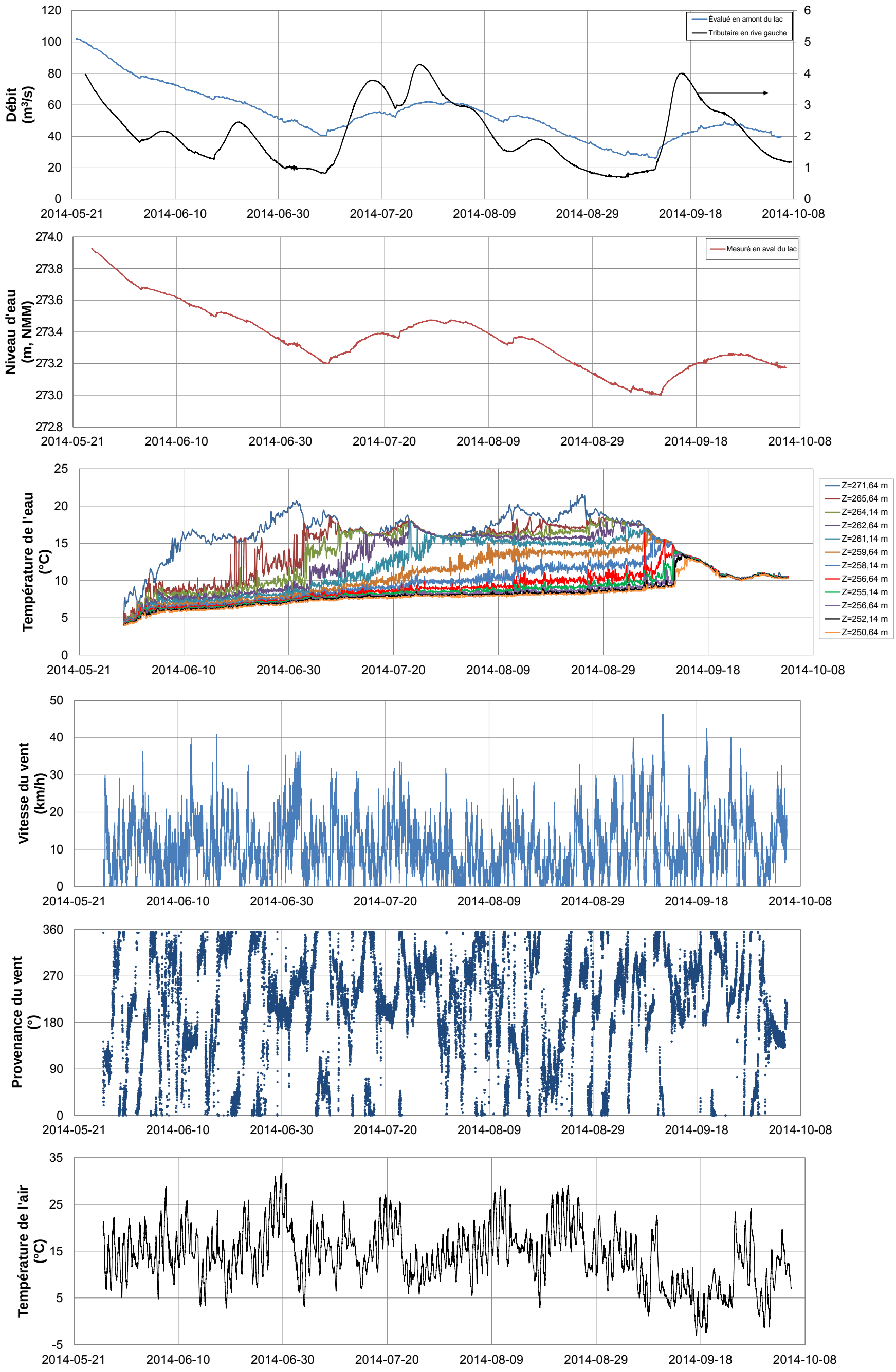


Figure 2-1 Séries temporelles des débits de la rivière Nemiscau et du tributaire en rive gauche, du niveau d'eau mesuré en aval du lac, de la température de l'eau à la chaîne de thermistors, de la vitesse et direction du vent, et de la température de l'air

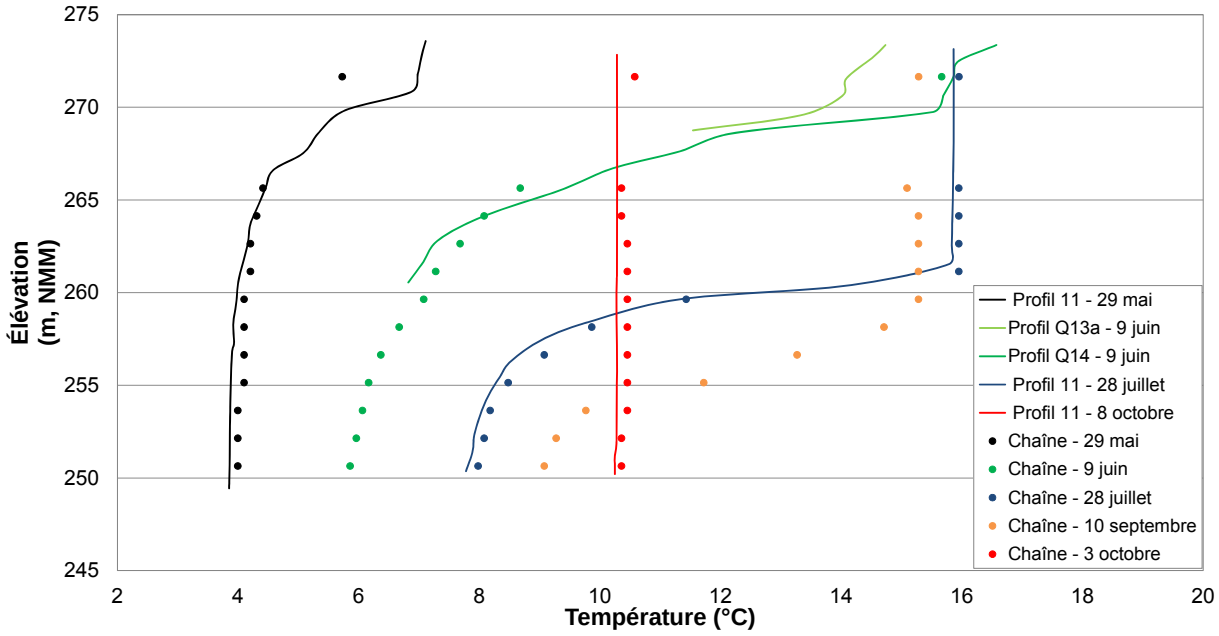


Figure 2-2 Comparaison entre les profils de température mesurés dans le lac des Montagnes et la chaîne de thermistors

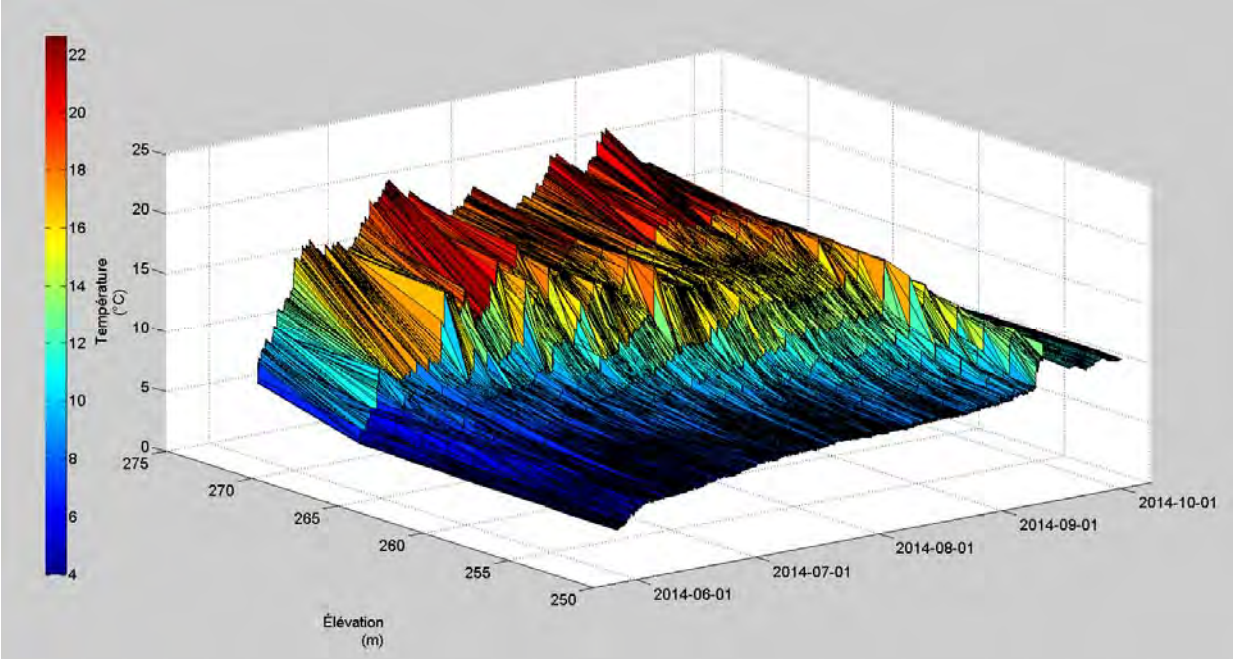


Figure 2-3 Évolution temporelle de la température de l'eau à la chaîne de thermistors selon l'élévation

3 INTRANTS POUR LA MODÉLISATION DE LA DILUTION

3.1 CALCULS DE LA DILUTION LIMITE

Afin d'évaluer la capacité de dilution du milieu, le rapport entre le débit ambiant (débit en provenance de la rivière Nemiscau à l'amont du site prévu pour le rejet) et le débit de l'effluent a été calculé. En effet, la majeure partie du débit qui alimente le point de rejet provient de la rivière Nemiscau. Quant au débit de l'effluent minier traité, il variera entre 0,022 m^3/s à l'an 1 et 0,062 m^3/s à l'an 26 (Tableau 3-1, Roche (2014c)).

Tableau 3-1 Débit de l'effluent pour les principales années d'exploitation (tiré de Roche, 2014c)

ANNÉE D'EXPLOITATION	DÉBIT À L'EFFLUENT FINAL			
	(m^3/an)	(m^3/j)	(m^3/h)	(m^3/s)
1	700 535	1 919	80,0	0,022
2	730 454	2 001	83,4	0,023
3	787 982	2 159	90,0	0,025
4	801 422	2 196	91,5	0,025
5	864 742	2 369	98,7	0,027
6	871 386	2 387	99,5	0,028
7	935 670	2 563	106,8	0,030
8	940 924	2 578	107,4	0,030
9	1 002 733	2 747	114,5	0,032
10	1 062 663	2 911	121,3	0,034
13	1 190 525	3 262	135,9	0,038
16	1 552 687	4 254	177,2	0,049
20	1 880 059	5 151	214,6	0,060
26	1 945 175	5 329	222,1	0,062

Le débit de la rivière Nemiscau pour la période du mois de mai à octobre 2014 a ensuite été utilisé pour calculer le rapport entre le débit ambiant et le débit de l'effluent.

3.2 MODÉLISATION HYDRODYNAMIQUE

Afin d'évaluer la dilution de l'émissaire dans le lac des Montagnes, il est requis d'établir des scénarios permettant de représenter adéquatement l'évolution de la thermocline et de l'écoulement hydrodynamique. Dans un premier temps, les mesures de la température le long de la colonne d'eau permettent de constater que le point de rejet de l'effluent minier peut être localisé à une élévation supérieure à celle de la thermocline pour la période d'eau libre comprise entre le printemps et l'automne. Puisqu'une stratification est observée sur les profils de température au cours de cette période, on en conclut que l'écoulement en provenance des tributaires du lac des Montagnes se fait principalement dans l'épilimnion, soit la couche située au-dessus de la thermocline. Pour ces conditions, on retient l'hypothèse que l'écoulement hydrodynamique se produit essentiellement dans cette couche. Pour qu'il y ait un mélange sur l'ensemble de la colonne d'eau, un profil de température uniforme serait requis. Or, ce n'est pas le cas pour une grande partie de la période de mesures; une condition de mélange complet n'étant observée que tard en automne. L'analyse de l'évolution des températures durant la période d'eau libre a permis d'extraire cinq scénarios (**Erreur ! Source du renvoi introuvable.**). Ces scénarios sont représentatifs des conditions observées durant la campagne de relevés de 2014 et comprennent notamment des conditions en période de crue et d'étiage estival. Il est à noter que le débit de la rivière Nemiscau du scénario 4 est inférieur au $Q_{2,7}$ en période estivale, lequel a été évalué à 29,2 m^3/s (WESA Envir-Eau, 2012).

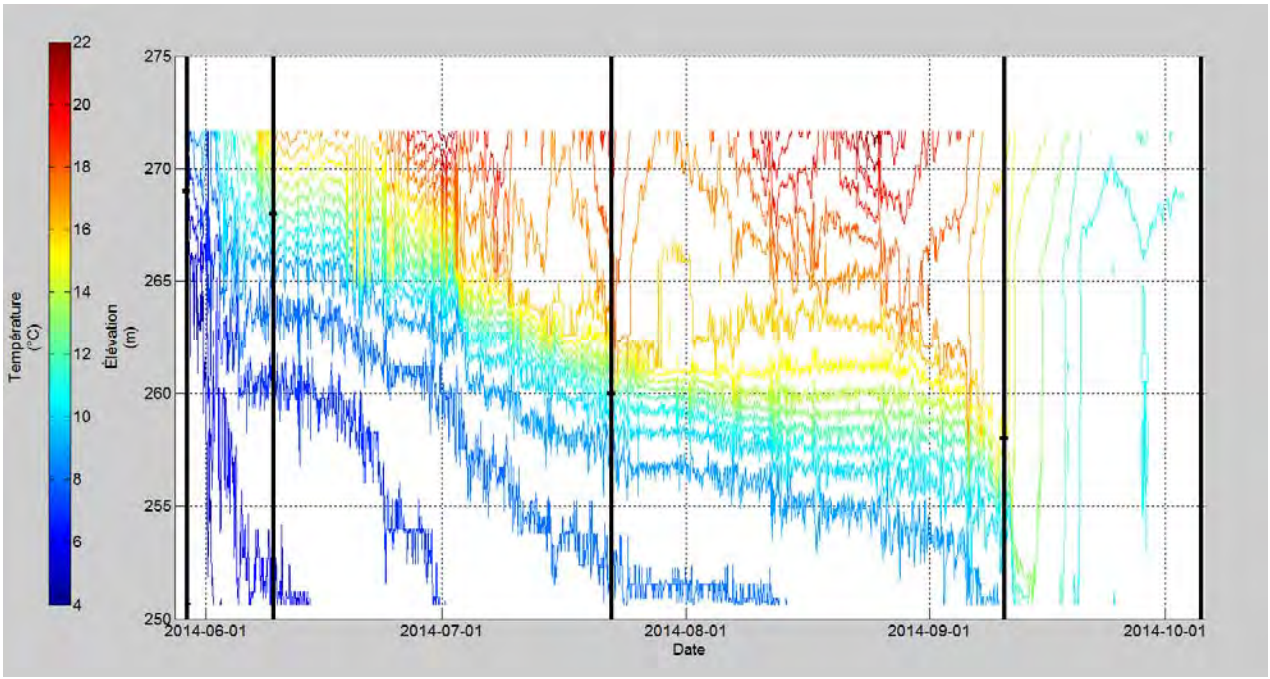


Figure 3-1 Identification des scénarios retenus pour la modélisation mise en lien avec l'évolution temporelle de la température de l'eau à la chaîne de thermistors selon l'élévation

Les résultats pour les cinq cas modélisés sont présentés à l'Annexe A. Les conditions de simulation y sont indiquées pour chaque cas simulé et un jeu de quatre figures est produit permettant d'observer le patron d'écoulement en termes de module de vitesse, de profondeur effective et de flux effectif. On y présente également la cote effective du fond du lac, laquelle a été établie en considérant l'élévation de la thermocline comme cote minimale du fond à imposer pour la modélisation.

Le frottement est considéré faible à l'interface et imposé à 0,01.

Au début de la période d'eau libre, la profondeur de l'épilimnion est faible et le courant entrant de la rivière Nemiscau coule dans une zone de faible profondeur. Sa vitesse et son inertie font en sorte qu'elle crée des courants de recirculation dans la partie Est du lac, orientée vers le nord. (Annexes A1 et A2 et Figure 3-2).

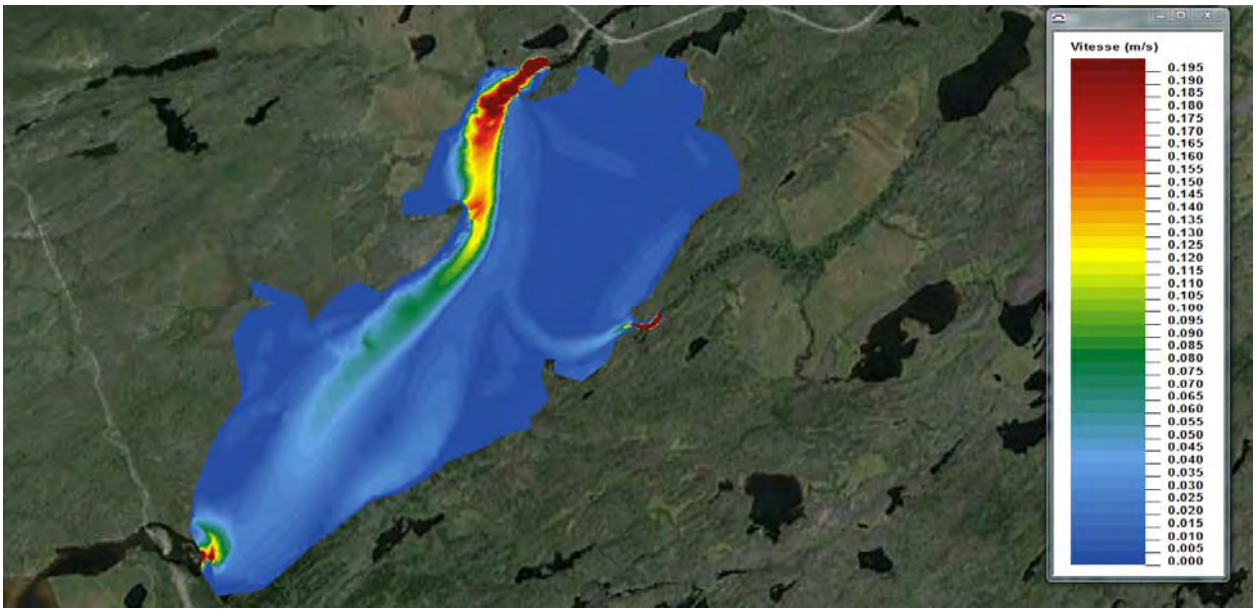


Figure 3-2 Patron typique d'écoulement (module de vitesse) pour un épilimnion de faible profondeur (scénario 1)

Quoique faibles (de l'ordre de quelques millimètres par seconde), ils suffisent à faire bifurquer le courant du ruisseau Spodumène (aussi appelé ruisseau D) vers le nord où il ira rejoindre l'écoulement principal de la rivière Némiscau. Il est à noter que les résultats obtenus de la modélisation ne présentent que les courants induits par la circulation hydrodynamique et n'incluent pas les effets potentiels d'épisodes de vent. Ces épisodes peuvent venir perturber ces patrons de circulation. Lorsque le vent tombe, le système tend à retrouver les conditions illustrées.

Pour tous les cas étudiés, l'écoulement dans le quadrant supérieur gauche du lac est caractérisé par de fortes vitesses dans une zone de faible profondeur. Le courant atteint la pointe en rive Ouest un peu au nord du centre du lac et longe ensuite la rive Ouest du lac en direction de l'exutoire.

Ce courant induit un courant de recirculation en rive Est du lac, qui est orienté vers le nord. Ce contre-courant vient longer le courant orienté sud près de la pointe précédemment identifiée en rive ouest. Les eaux qui remontent vers le nord sont éventuellement aspirées par le courant orienté sud en rive gauche. Les eaux du ruisseau Spodumène sont dirigées vers le quadrant nord-ouest du lac.

Ces résultats illustrent la complexité des patrons de circulation caractérisés par de faibles vitesses et la nécessité d'obtenir cette information pour permettre de sélectionner la position de l'émissaire. Comme nous le verrons au chapitre suivant, le site a été établi suite à l'analyse de ces patrons de circulation de façon à favoriser la dilution.

Tableau 3-2 Paramètres physiques des scénarios considérés pour la modélisation

SCÉNARIO	DATE	DÉBIT AMONT[1]	DÉBIT DU TRIBUTAIRE[1]	NIVEAU D'EAU AVAL[1]	TEMPÉRATURE DE L'EAU	ÉLÉVATION APPROXIMATIVE DE LA THERMOCLINE
		(m^3/s)	(m^3/s)	(m, NMM)	(°C)	(m, NMM)
1	2014-05-29	86,7	2,6	273,79	6 [2,3]	269 [2,3]
2	2014-06-09	73,1	2,0	273,63	14 [2]	268 [2,3]
3	2014-07-28	61,8	4,2	273,47	16 [2,3]	260 [2,3]
4	2014-09-10	26,6	0,9	273,01	15 [3]	258 [3]
5	2014-10-05 [4]	39,7	1,2	273,18	10 [2,3]	N/A [2,3,5]

1 Moyenne journalière.

2 Estimation basée sur une observation visuelle des profils de température.

3 Estimation basée sur une observation visuelle des données de la chaîne de thermistors.

4 Les débits correspondent à ceux du 5 octobre mesurés entre minuit et 14:42. Les niveaux d'eau correspondent à ceux du 5 octobre mesurés entre minuit et 08:52. Le profil de température correspond à celui du 6 octobre. Les vents correspondent à ceux mesurés entre minuit et 09:25.

5 Aucune thermocline observée à ce moment.

3.2.1 MODÉLISATION CORMIX

Le point de rejet de l'effluent minier retenu pour la modélisation est localisé à environ 1,3 km en aval de l'embouchure de la rivière Nemiscau dans le lac des Montagnes (Carte 1-3). La conduite de l'émissaire est d'une longueur d'environ 3,6 km sous l'eau et d'un diamètre de 0,25 m. Afin d'assurer une dilution accrue, l'émissaire est localisé dans la zone de courant issue des apports en eau provenant de la rivière Nemiscau. Enfin, le diffuseur permet de répartir l'effluent sur une plus grande surface afin d'en accroître la dilution initiale.

La modélisation CORMIX est réalisée à partir des caractéristiques de trois catégories d'intrants : l'effluent, les conditions ambiantes et les caractéristiques du diffuseur (Tableau 3-3).

Les caractéristiques requises pour l'effluent sont la température et le débit. Pour chaque scénario, les conditions suivantes ont été retenues:

- En raison de la longueur immergée de la conduite qui se situe dans l'épilimnion, la température de l'effluent imposée à la sortie de l'émissaire correspond à celle du milieu ambiant;
- Trois débits de l'effluent minier traité sont considérés : 22, 40 et 62 L/s afin d'évaluer l'évolution temporelle des quantités de rejet au cours des 26 années d'exploitation (Tableau 3-1).

Les conditions ambiantes comprennent notamment les paramètres géométriques, lesquels ont été estimés à partir du modèle numérique de terrain. La vitesse du vent correspond à la moyenne journalière des données relevées. La température de l'eau est également estimée à partir des mesures. Les vitesses de courant ont été extraites des résultats du modèle hydrodynamique au droit du diffuseur pour les cinq scénarios.

Les caractéristiques à l'émissaire ont trait à la géométrie du diffuseur. Le diffuseur sera installé à l'extrémité de la conduite et ce dernier sera d'une longueur de 150 m et doté de 30 ouvertures de 0,04 m, chacune espacée d'environ 5 m.

Tableau 3-3 Intrants au modèle CORMIX

PARAMÈTRE	UNITÉ	SCÉNARIO				
		1	2	3	4	5
Effluent						
Température	°C	6	14	16	15	10
Débit	L/s	22, 40 et 62				
Ambiant						
Profondeur moyenne	m	4,8	4,6	4,47	4	4,2
Profondeur au site de rejet	m	4,8	4,6	4,47	4	4,2
Vitesse du vent	m/s	2,5	1,8	3,2	1,6	3,3
Vitesse du courant	m/s	0,12	0,11	0,098	0,047	0,075
Manning "n"		0,01	0,01	0,01	0,01	0,01
Température	°C	6	14	16	15	10
Largeur	m	700	700	700	700	700
Caractéristiques du diffuseur						
Diamètre des ouvertures	m	0,04	0,04	0,04	0,04	0,04
Élévation des ouvertures	m	0,25	0,25	0,25	0,25	0,25
Longueur du diffuseur	m	150	150	150	150	150
Distance de la première extrémité	m	125	125	125	125	125
Distance de la seconde extrémité	m	241,7	239,6	236,5	230,0	231,4
Ratio de contraction		1	1	1	1	1
Nombre d'ouvertures		30	30	30	30	30
γ[1]	°	128,9	130,2	132	135,6	134,8
Σ	°	0	0	0	0	0
σ[1]	°	3,9	5,2	7	10,57	9,8
B	°	55	55	55	55	55

1 Pour un diffuseur d'une géométrie donnée, l'angle entre le courant et le diffuseur (ou autre composante du diffuseur) varie. Les valeurs des paramètres σ et β sont fonction de l'angle du courant, lequel est extrait du modèle 2D et varie selon les scénarios de débit.

3.3 MODÉLISATION H2D2

Les panaches sont considérés comme ceux d'un contaminant conservatif, ce qui est conservateur au niveau des concentrations calculées. À défaut de données permettant de procéder à une calibration des résultats, des jeux de coefficients utilisés dans le cadre d'autres études de dispersion ont été imposés. Une étude de sensibilité a également été conduite sur certains paramètres pour confirmer les valeurs retenues.

Ces simulations permettent d'observer l'évolution du patron de dilution du rejet durant la période libre de glace, selon l'évolution de la profondeur de la thermocline.

La diffusion est contrôlée par le tenseur symétrique des diffusivités D_{xx}, D_{xy}, D_{yy} dont le calcul est décrit sur le site Internet de l'INRS-ETE dédié au modèle de calculs H2D2[1].

Les diffusivités verticale D_v et horizontale D_h sont directement issues des résultats hydrodynamiques. Le calcul des D_{xx}, D_{xy}, D_{yy} est contrôlé par les trois facteurs d'étalonnage β_f, β_h et β_L. A ces facteurs, viennent s'ajouter deux facteurs numériques de stabilisation, soit le nombre de Peclet[2] et le nombre de Lapidus[3].

Finalement, ces paramètres sont introduits dans un calcul sous la forme de propriétés globales de H2D2[4]:

Les valeurs utilisées pour ces coefficients sont :

1.0d-09,	# 1 Diffusivité moléculaire (m^2/s)	D_m
1.0d-00,	# 2 Poids du coefficient de diffusivité verticale	β_f
1.0d-00,	# 3 Poids du coefficient de diffusivité horizontale	β_h
1.0d+01,	# 4 Poids du coefficient de diffusivité longitudinale	β_L
1.0e+02,	# 5 Nombre de Peclet pour la stabilisation des calculs	
1.0e-05,	# 6 Nombre de Lapidus pour la stabilisation des calculs	

Une étude de sensibilité sur les nombres de Peclet et de Lapidus a permis de confirmer les valeurs utilisées dans le cadre d'autres études.

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[1] http://www.gre-ehn.ete.inrs.ca/H2D2/contenu_documentation/elements/advection-diffusion/calculation-of-diffusivities
[2] http://www.gre-ehn.ete.inrs.ca/H2D2/contenu_documentation/glossary-1/glossary#Peclet_number
[3] http://www.gre-ehn.ete.inrs.ca/H2D2/contenu_documentation/glossary-1/glossary#lapidus
[4] http://www.gre-ehn.ete.inrs.ca/H2D2/contenu_documentation/elements/advection-diffusion/conservative-contaminant/global-properties

4 RÉSULTATS

4.1 DILUTION LIMITE

La dilution limite de l'effluent minier traité dans le lac est évaluée en effectuant le rapport entre le débit de la rivière Nemiscau et le débit de l'effluent. Il est possible d'évaluer cette valeur en utilisant les données de débit disponibles pouvant contribuer à la dilution de l'effluent. Les données disponibles couvrent la période comprise entre la fin du mois de mai et le début d'octobre 2014. Pour cette période, les débits de la rivière Nemiscau ont varié entre 26 et 102,5 m^3/s. En considérant ces valeurs, le facteur de dilution limite fluctue entre 1172 et 4612 à l'année 1 et ce facteur est réduit à une gamme comprise entre 422 et 1661 à l'an 26, soit en fin de vie utile de la mine (Figure 3-2). En effet, pour une même série temporelle de débits de la rivière Nemiscau, l'augmentation du débit de l'effluent traité se traduit nécessairement par une diminution de la dilution limite.

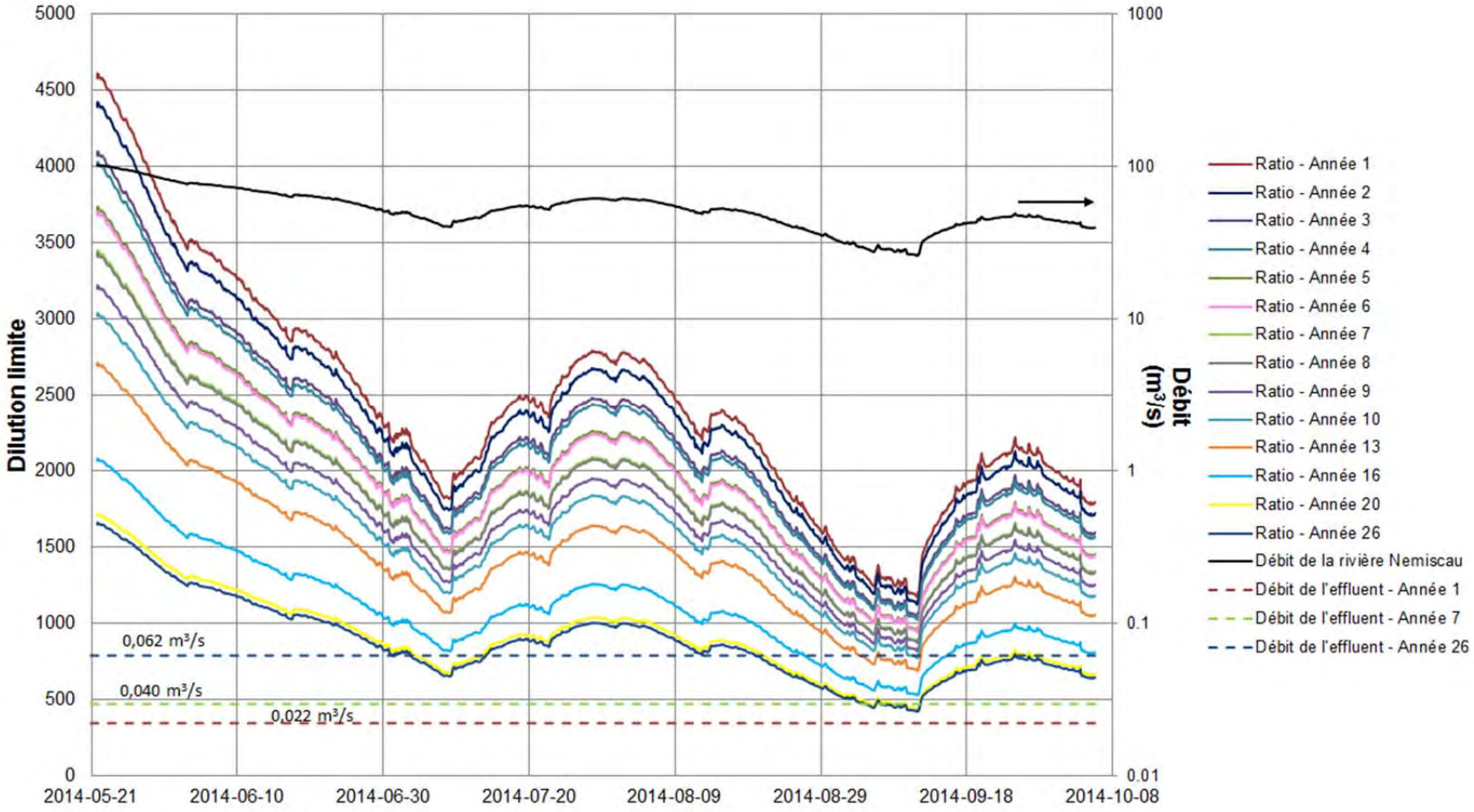

Figure 4-1 Débit ambiant (DA) provenant de la rivière Nemiscau, débit estimé (DE) pour l'effluent minier et rapport DA/DE

4.2 MODÉLISATION CORMIX

Pour tous les cas modélisés, la configuration est telle que la zone de dilution initiale ne comprend pas de remontée du panache vers l'amont. De manière générale, on observe que la dilution initiale se produit approximativement dans les 75 m à partir du point de rejet (Tableau 4-1). De plus, la largeur du panache est de l'ordre de 60 m dans tous les cas[5]. L'augmentation du débit de l'effluent minier avec les années d'exploitation se traduit par une diminution de la dilution initiale dans cette zone. Enfin, la distance à laquelle la dilution est de 1 :100 est généralement inférieure à 5 m. En période d'étiage estival, cette distance peut dépasser les 20 m. Les résultats détaillés des simulations sont présentés à l'Annexe B.

Au printemps, le débit de la rivière Nemiscau est supérieur à 70 m^3/s et les vitesses du courant au voisinage de l'effluent excèdent 0,11 m/s. Malgré la diminution de la dilution associée à l'augmentation du débit de l'effluent, la dilution initiale est supérieure à 500 pour les deux scénarios et pour la plage de débits modélisés.

À l'été, les scénarios modélisés comprennent des débits de 26,6 et 61,8 m^3/s, avec des vitesses de courant comprises entre 0,047 et 0,098 m/s. Malgré la réduction des vitesses de courant en condition d'étiage estival, le facteur de dilution initiale reste néanmoins supérieur à 180.

À l'automne, le scénario comprend un débit de 39,7 m^3/s, de sorte que les vitesses de courant sont d'environ de 0,075 m/s. Bien que la dilution initiale diminue avec l'augmentation du débit de l'effluent, le facteur est supérieur à 300.

Enfin, pour tous les scénarios modélisés dont le débit de l'effluent est de 62 L/s, le facteur de dilution dépasse 180 à une distance inférieure à 100 m (Figure 4-3). La dilution 1 :100 est atteinte à une distance inférieure à 25 m.

Les valeurs de dilution élevées s'expliquent en raison du fait que le diffuseur est localisé dans la zone de courant principal. Les valeurs de dilution obtenues sont toutefois toutes inférieures à la dilution limite (Figure 4-4).

[5] Distribution spatiale du champ de concentration de type gaussienne. La largeur présentée correspond à une concentration de 46 % de celle au centre-ligne.

Tableau 4-1 Résultats des modélisations CORMIX

SCÉNARIO	DÉBIT DE L'EFFLUENT MINIER	DISTANCE POUR LA DILUTION INITIALE AU DÉBUT DE LA ZONE DE MÉLANGE PASSIVE	LARGEUR DU PANACHE AU DÉBUT DE LA ZONE DE MÉLANGE PASSIVE[1]	DILUTION INITIALE AU DÉBUT DE LA ZONE DE MÉLANGE PASSIVE	DISTANCE POUR LAQUELLE LA DILUTION EST DE 1:100
	(L/s)	(m)	(m)		(m)
1	22	74,8	64,9	1700	< 5
1	40	74,8	65,1	937	< 5
1	62	74,8	65,4	607	< 5
2	22	74,7	63,7	1479	< 5
2	40	74,7	63,9	816	< 5
2	62	74,7	64,3	530	< 5
3	22	74,4	62,0	1235	< 5
3	40	74,4	62,3	682	< 5
3	62	74,4	62,8	444	< 5
4	22	75,9	57,5	492	< 5
4	40	75,9	58,7	277	9,5
4	62	75,9	60,8	186	21,2
5	22	73,9	59,3	850	< 5
5	40	73,9	59,8	471	< 5
5	62	73,9	60,8	309	< 5

[1] Distribution gaussienne. Largeur à une concentration de 46 % de la concentration au centre-ligne.

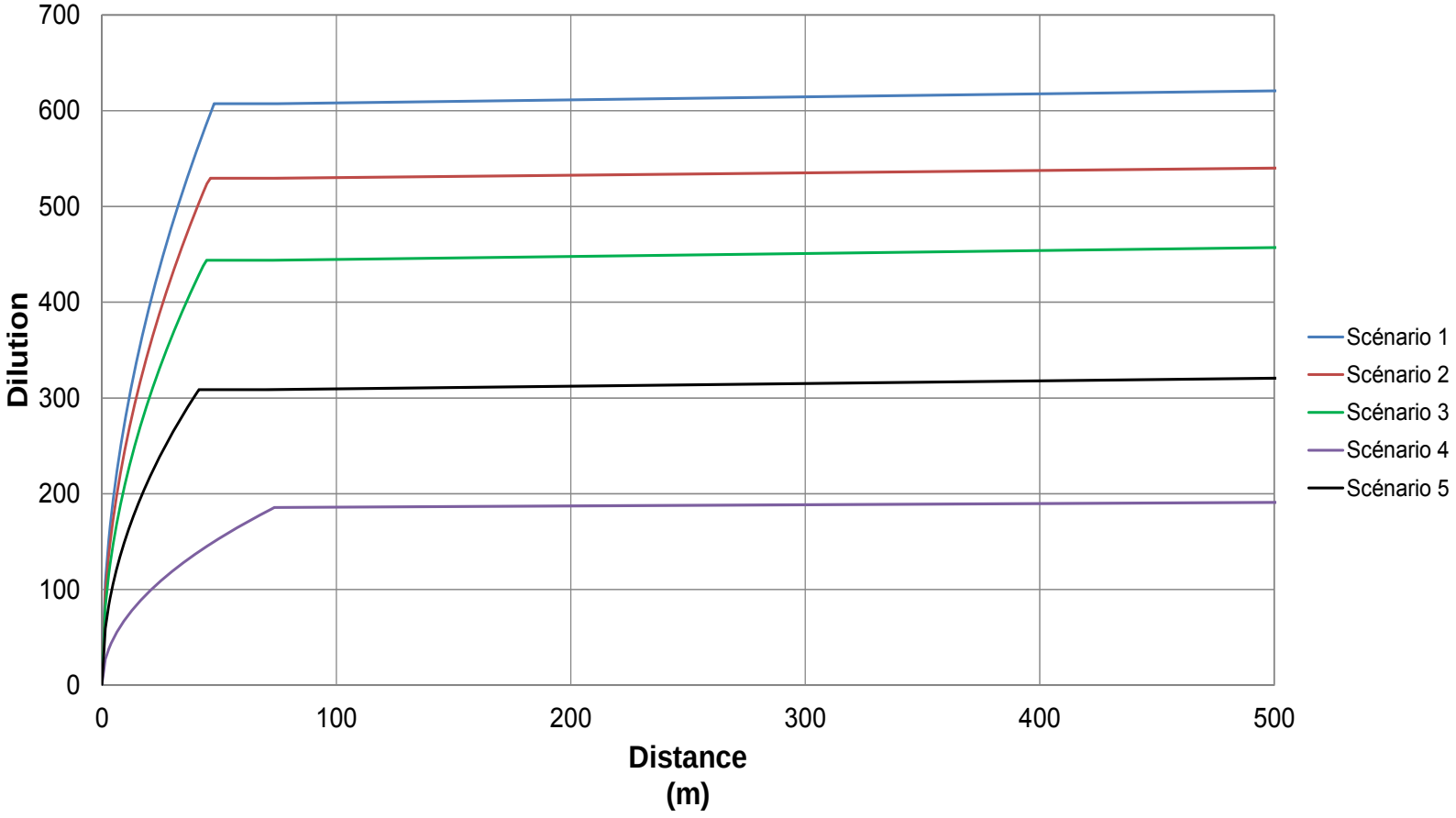

Figure 4-2 Dilution selon la distance aval pour les scénarios modélisés lorsque le débit de l'effluent est de 62 L/s

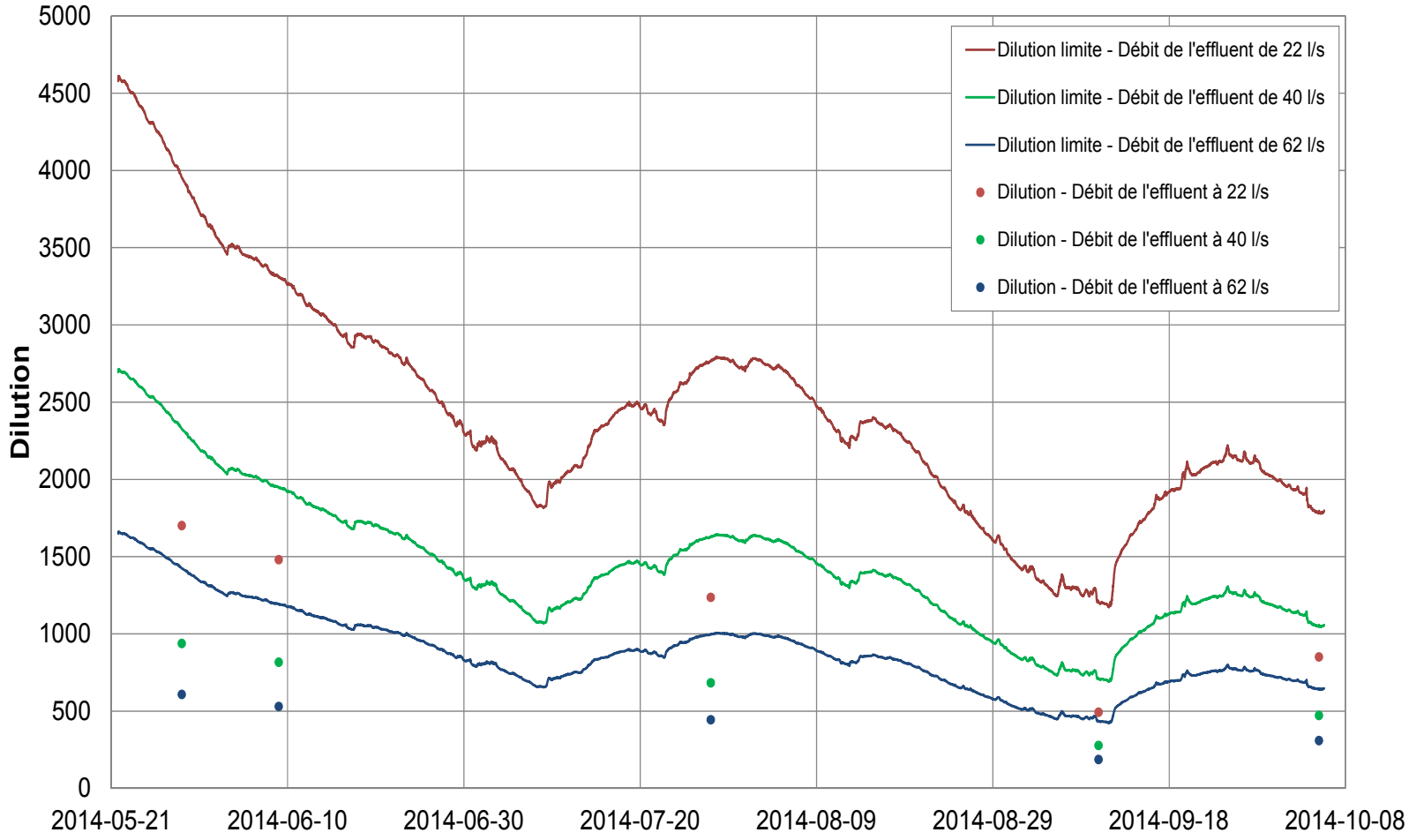

Figure 4-3 Comparaison entre les dilutions initiales obtenues avec CORMIX et la dilution limite

4.3 MODÉLISATION H2D2

Cette section présente les résultats obtenus avec le modèle H2D2 en termes de dilutions pour les cinq cas modélisés. Les détails des simulations hydrodynamiques qui ont servies à calculer les panaches sont présentés à l'annexe A. On doit noter que pour ces simulations, l'origine du panache est localisée environ 70 m en aval de la position de l'émissaire, ce dernier étant représenté par un trait blanc (Figures 4-1 à 4-5). La variation de la dilution calculée dans la zone des premiers 70 m « near field » est traitée dans la section présentant les résultats obtenus avec le modèle Cormix. Dans cette section on s'intéresse au champ de dispersion situé à l'extérieur de cette zone et qui est définie comme la zone distale ou « far field ».

Au printemps, au début de la période d'eau libre, la stratification s'établit lentement, la température de l'eau au fond du lac est d'environ 4°C et elle se réchauffe rapidement en surface (Figures 2-2). Par conséquent, la profondeur de l'épilimnion est faible et progresse de la cote 269 m à la cote 268 m durant la période comprise entre le 29 mai et le 9 juin. Le panache est donc restreint à la tranche d'eau qui se situe de la surface jusqu'à la cote de la thermocline (Figures 4-1 et 4-2). Le rejet présente peu de dispersion latérale et atteint rapidement l'exutoire du lac.

Durant l'été, la thermocline atteint des cotes variant entre 258 et 260 m et ainsi la profondeur de l'épilimnion varie entre 13 à 15 mètres (Figures 2-2; période entre le 28 juillet et le 10 septembre). Le rejet dispose donc d'une tranche de plus grande épaisseur pour se disperser.. Pour ces deux cas, des courants de retour sont induits, provoqués par la présence du haut fond présent à la sortie du lac et qui fait obstacle. Une fraction du volume d'eau provenant de la rivière Nemiscau est évacuée à l'exutoire du lac mais l'autre fraction se bute au haut fond et bifurque vers le nord comme le démontrent les résultats tirés du modèle hydrodynamique (annexe A; scénarios 3 et 4). La présence d'un haut fond au centre du lac complexifie le patron de circulation. Tout ceci concoure à produire une zone plus étendue de dispersion. Les courants de retour viennent éventuellement se rabattre sur l'écoulement principal induit par la rivière Nemiscau pour éventuellement être redirigé vers l'exutoire. L'équilibre s'établit et ce sont ces conditions qui sont illustrées aux figures 4-2 et 4-3. Les résultats du scénario 5 sont relativement similaires aux scénarios 3 et 4 sauf que ce dernier ne présente pas de thermocline. Les différences de dilution entre ces trois derniers scénarios sont principalement dues à la différence de débit.

On doit mentionner que les résultats obtenus sont ceux produits essentiellement par la circulation hydrodynamique. Ils n'incorporent pas les effets de perturbation qui peuvent être provoqués par la présence de vents en surface. Ces vents peuvent générer des vagues dans la région supérieure de l'épilimnion et éventuellement faire augmenter le taux de dilution tout en modifiant la zone couverte par le panache. Comme ces conditions sont variables les effets le sont forcément dans le temps. Sur le long terme, les conditions devraient toujours tendre vers les résultats obtenus de la modélisation, plus particulièrement en période de faible vent.

Pour les cinq cas modélisés, l'intensité du courant produit par la rivière Nemiscau ainsi que la localisation de l'émissaire font en sorte qu'il n'y a pas de dispersion dans la baie située au nord-ouest du lac. Hormis pour cette baie, la zone de moindre dilution longe la rive ouest du lac.

Même en condition d'étiage (scénario 4) la dilution atteint tout de même un facteur de 300 fois pour une fraction importante de la zone d'étude. Il importe ici de rappeler que le débit de la rivière Nemiscau du scénario 4 est inférieur au $Q_{2,7}$ en période estivale, lequel a été évalué à 29,2 m^3/s (WESA Envir-Eau, 2012).

Figure 4-4 Dilution calculée pour la zone de mélange passive du scénario 1 (sim 0014)

Figure 4-5 Dilution calculée pour la zone de mélange passive du scénario 2 (sim 0015)

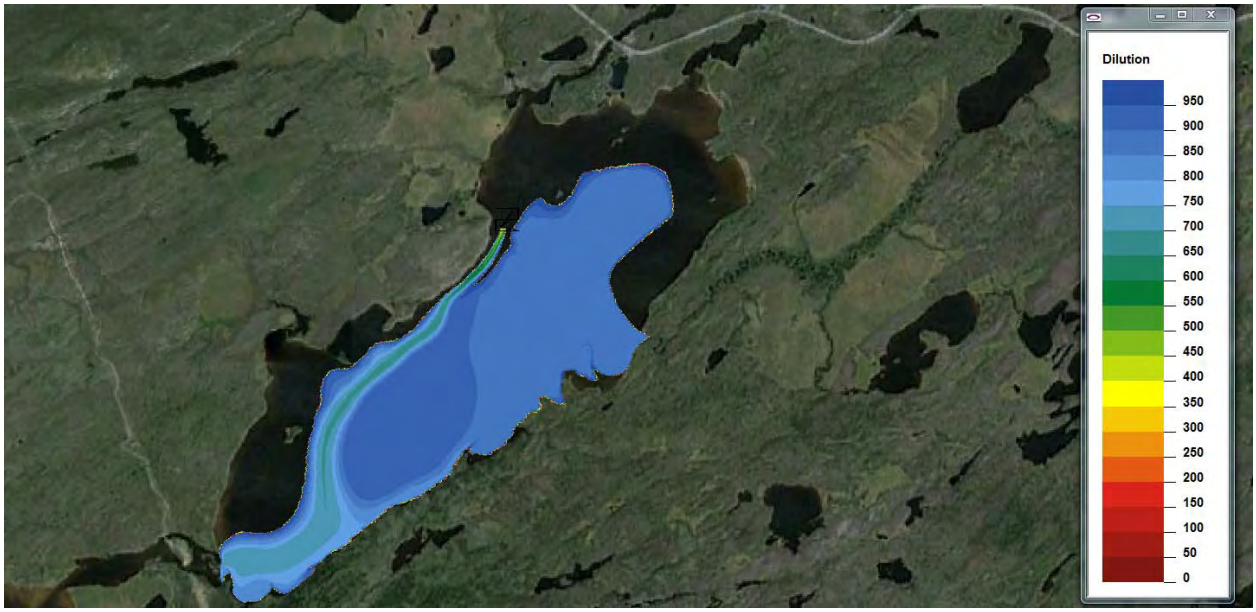

Figure 4-6 Dilution calculée pour la zone de mélange passive du scénario 3 (sim 0016)

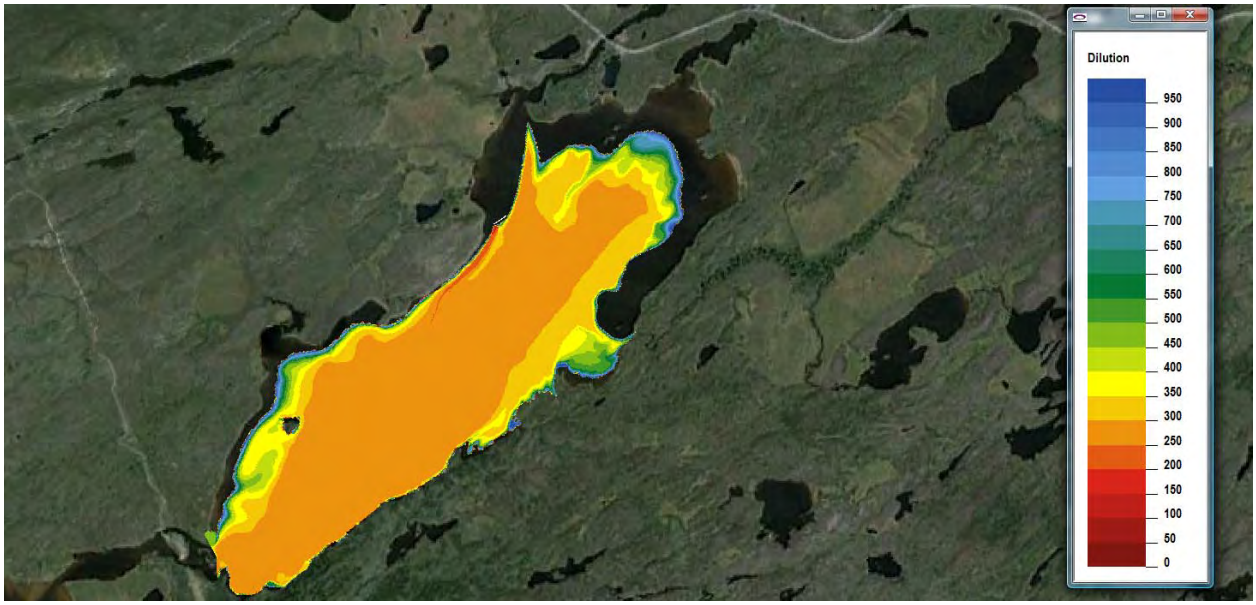

Figure 4-7 Dilution calculée pour la zone de mélange passive du scénario 4 (sim 0017)

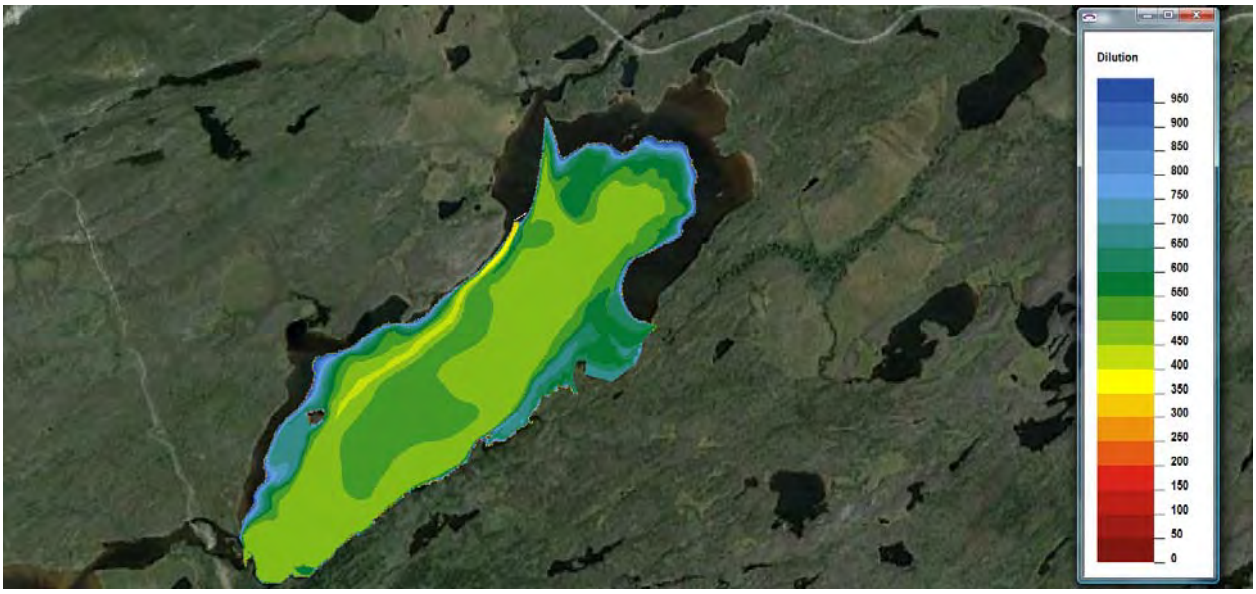

Figure 4-8 Dilution calculée pour la zone de mélange passive du scénario 5 (sim 0018)

5 BILAN DES RÉSULTATS

Les calculs de dilution initiale ainsi que la modélisation de la dispersion du panache indiquent que la limite de la zone de mélange 1 :100 est localisée à une distance inférieure à 5 m du diffuseur en conditions de printemps et d'automne. À l'été, cette zone peut légèrement dépasser les 20 m à l'année 26.

Au printemps, deux scénarios pour lesquels le débit de la rivière Nemiscau est supérieur à 70 m^3/s ont été modélisés. Les résultats issus du modèle CORMIX montrent que le facteur de dilution initial est supérieur à 500 pour ces deux scénarios et pour les débits d'effluent modélisés. Le panache dans le reste du lac atteint des facteurs de dilution de plus de 600. La zone de « forte » concentration est relativement restreinte compte-tenu de la faible profondeur de la thermocline.

À l'été, les scénarios modélisés comportent des débits de 26,6 et 61,8 m^3/s, avec des vitesses de courant comprises entre 0,045 et 0,1 m/s. Le scénario le plus critique pour la dilution correspond à celui d'un étiage estival. Pour les débits d'effluent modélisés, le facteur de dilution initial s'avère d'au moins 180. Lorsque l'épilimnion croît en profondeur, le volume d'eau permettant de diluer le panache augmente mais la bathymétrie joue un plus grand rôle dans l'établissement du patron de circulation. Ainsi, le seuil à l'exutoire et la présence d'un haut fond au centre du lac modifient les patrons de recirculation. Par conséquent, le panache s'étend sur une plus grande partie du lac. Toutefois, les facteurs de dilution obtenus par modélisation sont supérieurs à 300 pour une fraction importante de la zone d'étude.

À l'automne, durant une période avec absence de thermocline, un scénario avec un débit de 39,7 m3/s a été modélisé. Pour la gamme de débits d'effluents modélisés, le facteur de dilution est supérieur à 300 dans la zone proximale de l'émissaire. Dans la zone distale, les dilutions modélisées sont supérieures à 400 pour une fraction importante du lac.

À la lumière des résultats obtenus, on peut conclure que le site sélectionné pour l'émissaire permettra de diluer rapidement l'effluent minier.

6 RÉFÉRENCES

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WESA ENVIR-EAU. 2012. *Étude hydrologique. Projet Whabouchi. Nemaska Lithium. Rapport final*. HB10015-00-03. 31 pages et annexes.

Annexe A

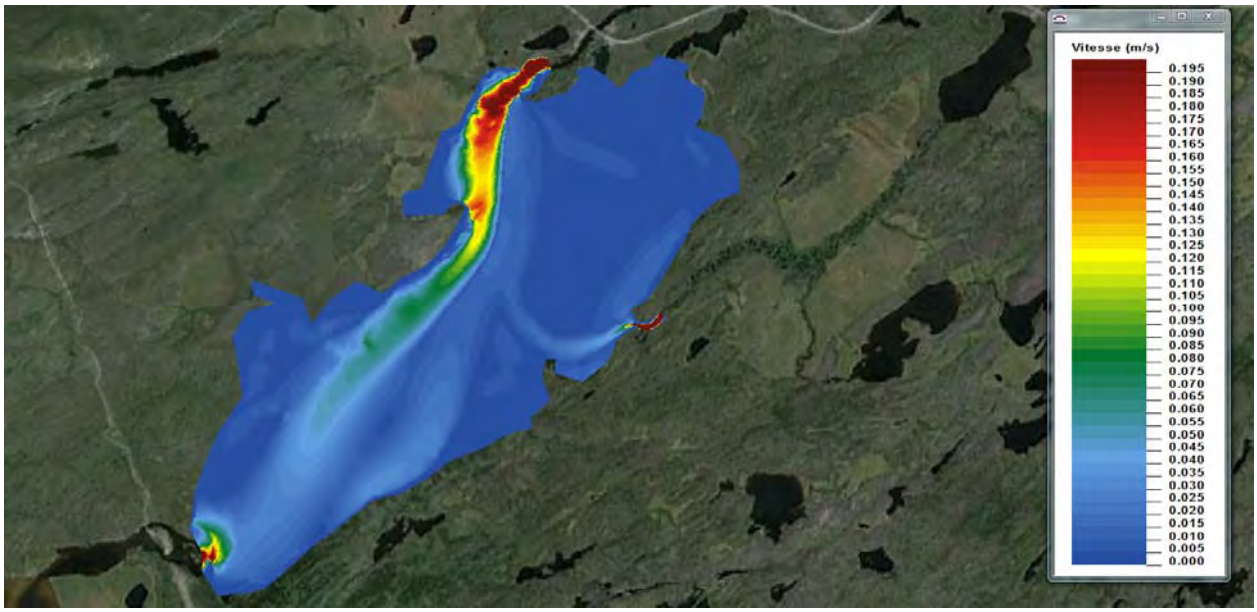
SIMULATIONS HYDRODYNAMIQUES

CONDITIONS POUR LE SCÉNARIO 1

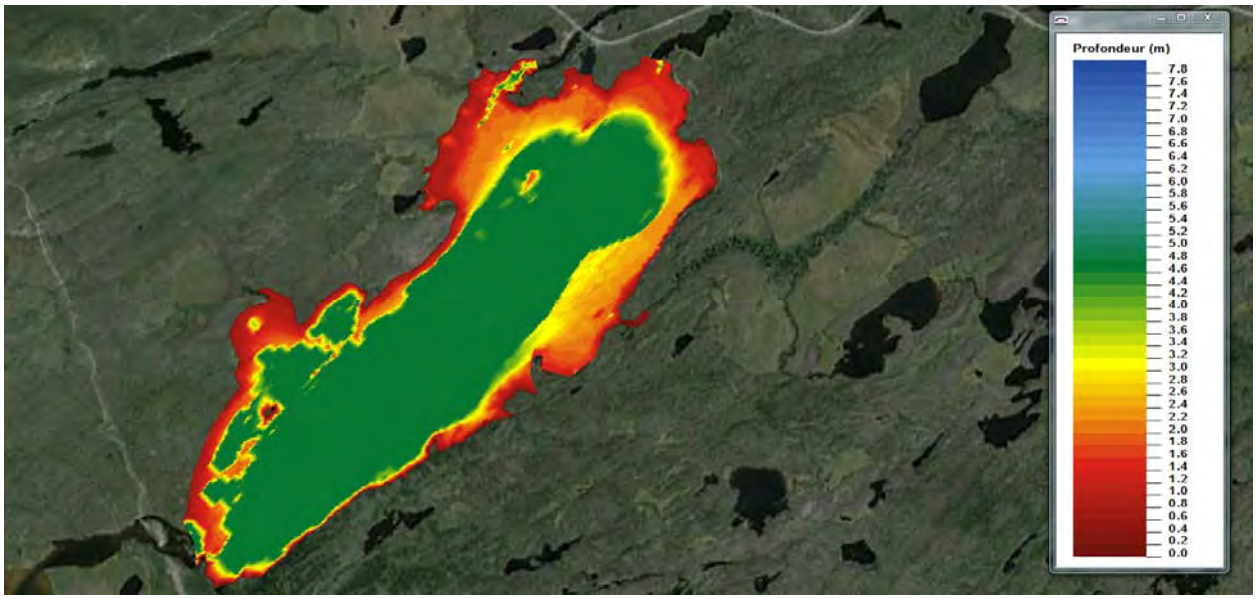
Simulations H2D2	Date Production	Heure	Cas	Débit Némiskau	Débit affluent	Niveau du lac	Thermocline	Particularités
				mcs	mcs	m	m	Date
sim0014	2014-12-12	9h30	Scénario 1	86.7	2.6	273.79	269	2014-05-29

COTE DU FOND AVEC THERMOCLINE À 269 M

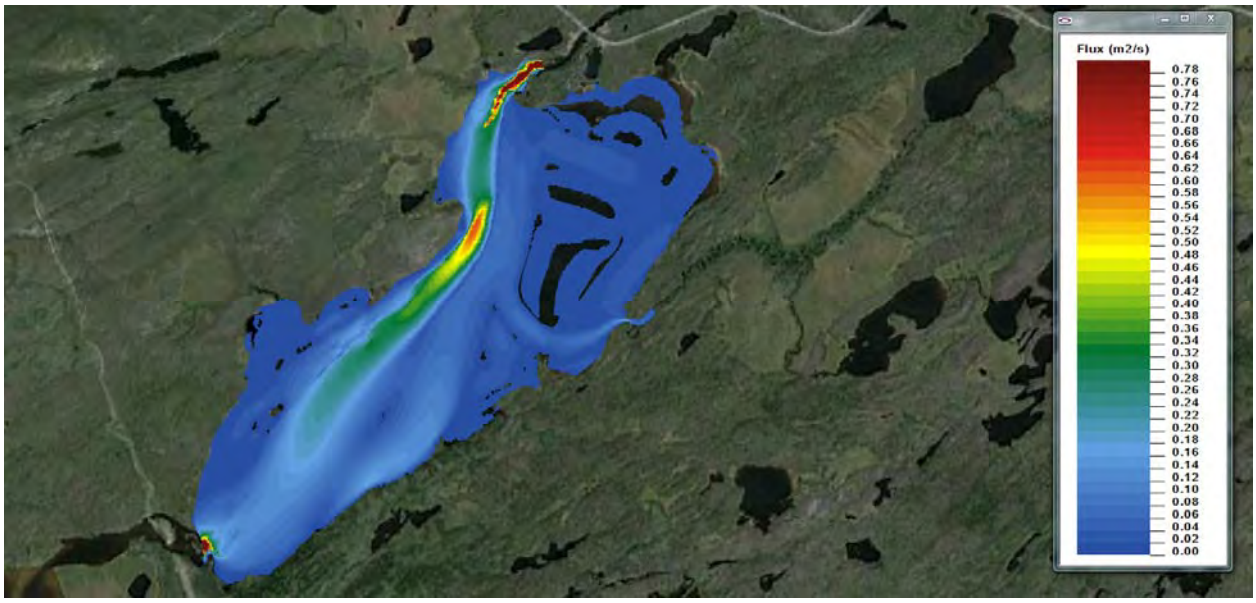
MODULE DE VITESSE



PROFONDEUR EFFECTIVE



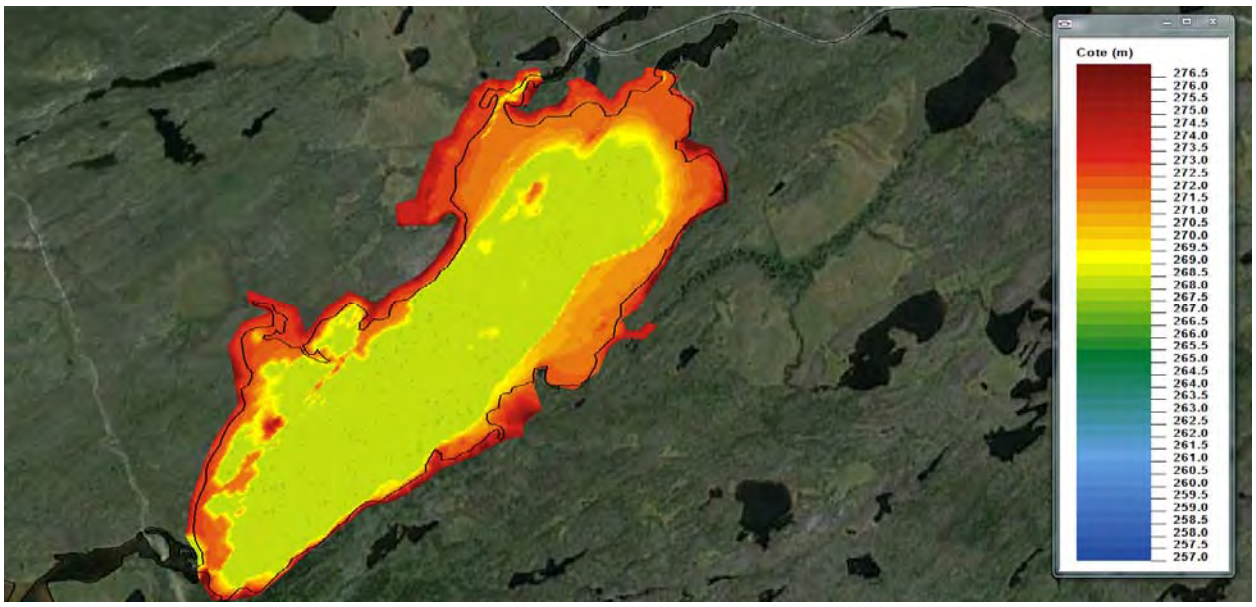
FLUX EFFECTIF



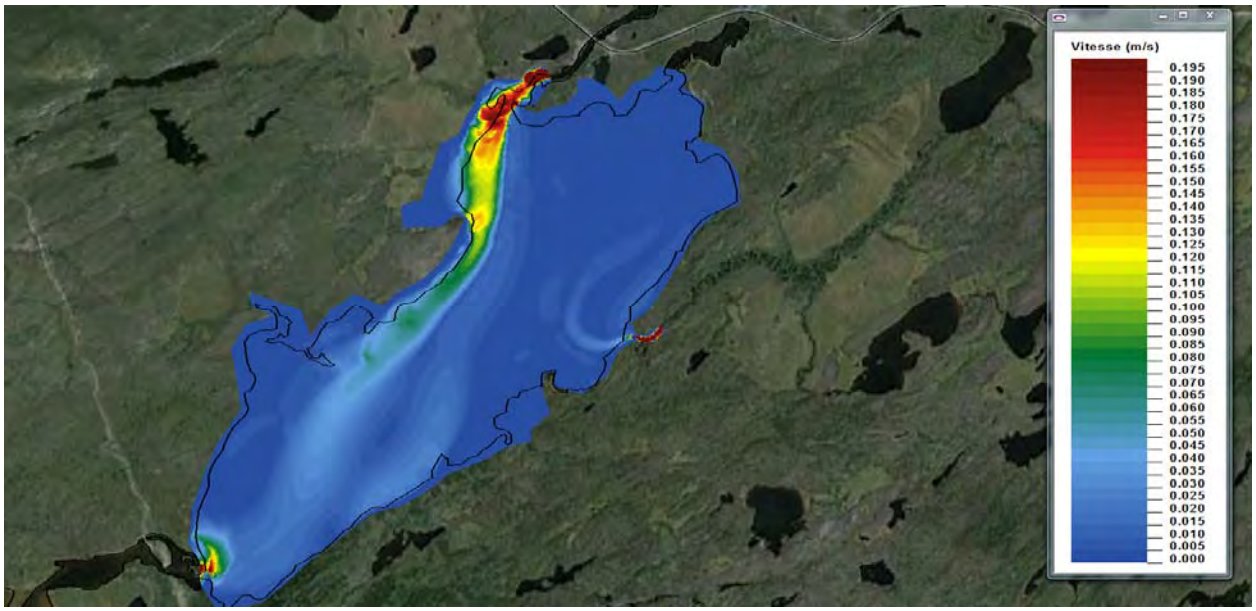
CONDITIONS POUR LE SCÉNARIO 2

Simulations H2D2	Date Production	Heure	Cas	Débit Némiskau	Débit affluent	Niveau du lac	Thermocline	Particularités
				mcs	mcs	m	m	Date
sim0015	2014-12-15	9h30	Scénario 2	73.1	2.0	273.63	268	2014-06-09

COTE DU FOND AVEC THERMOCLINE À 268 M



MODULE DE VITESSE



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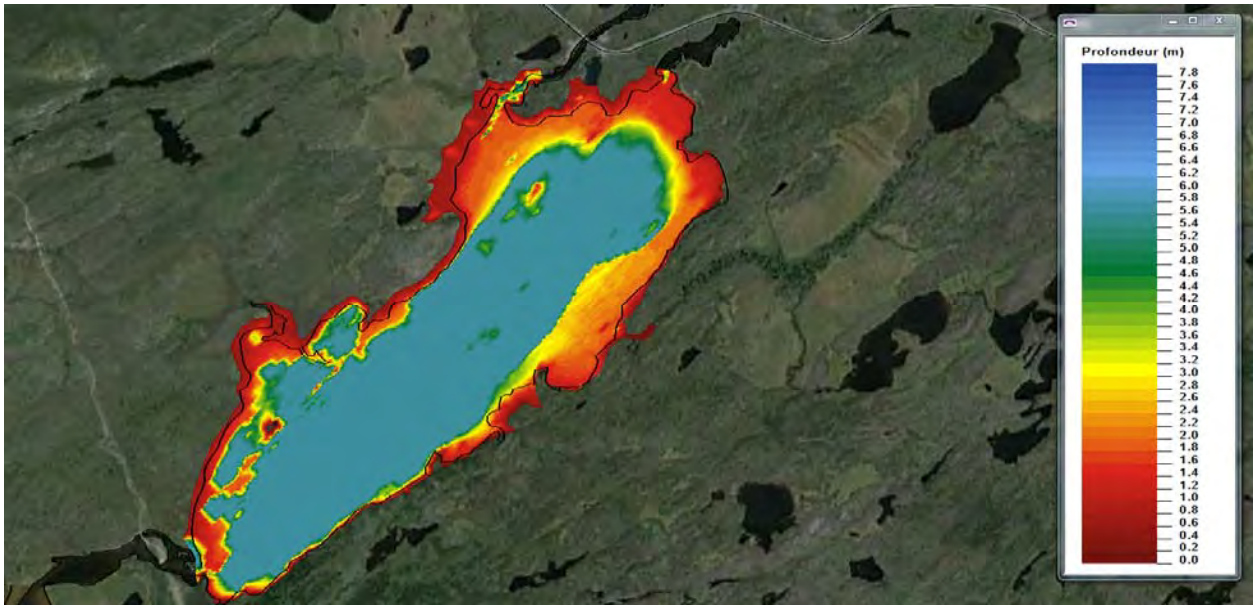
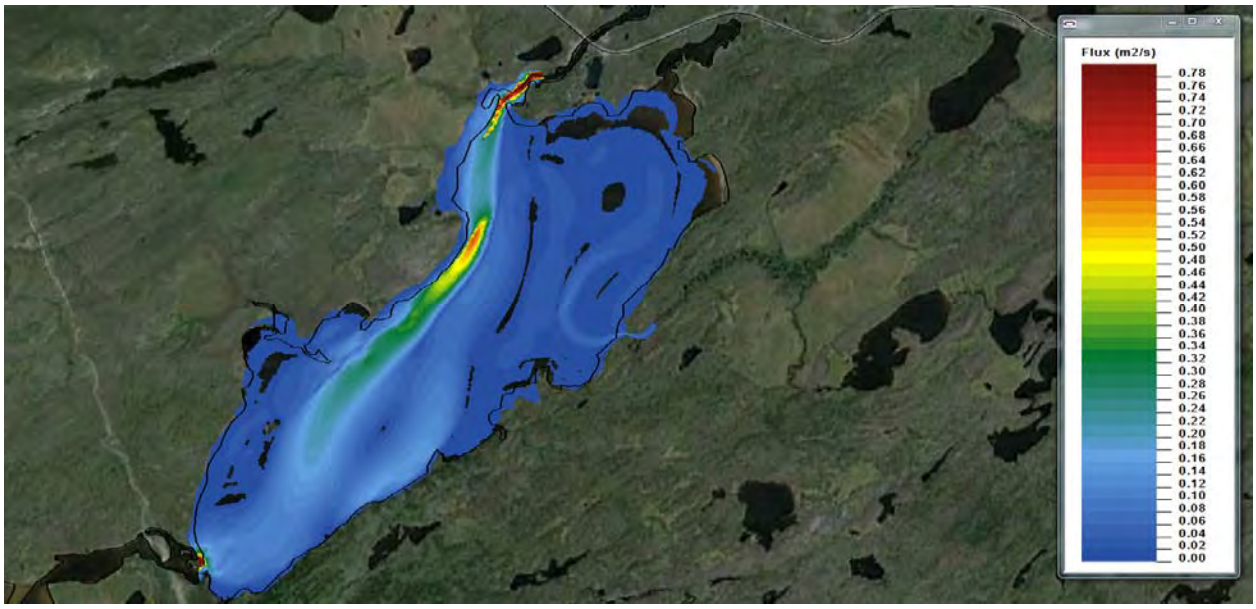


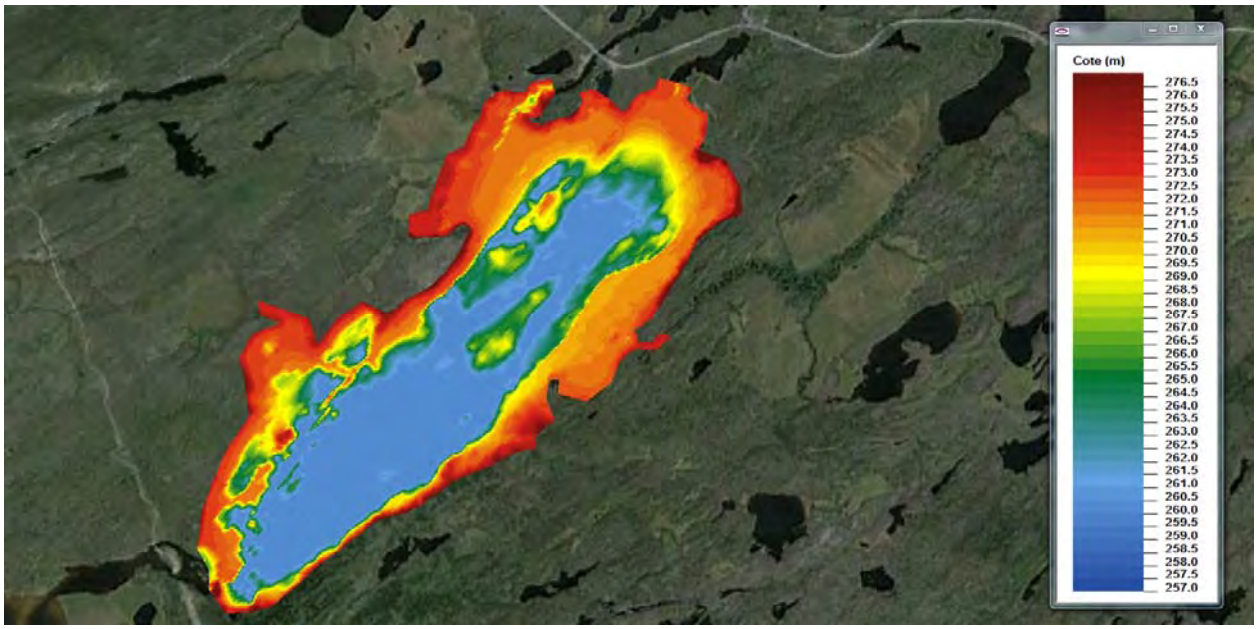
FLUX EFFECTIF



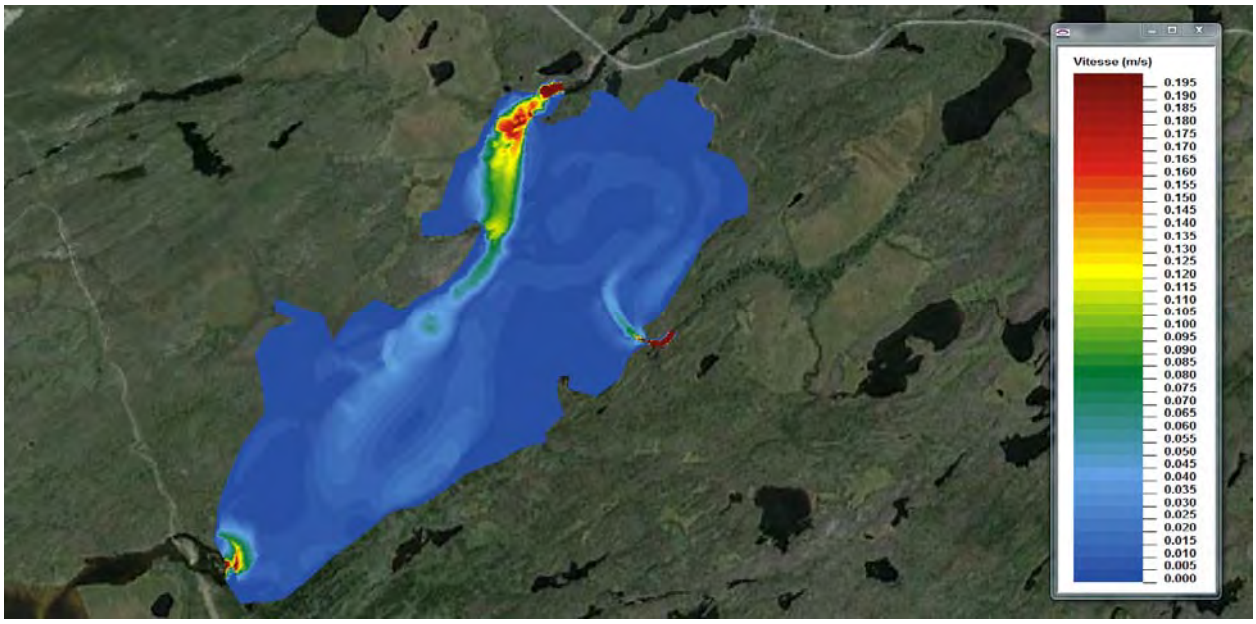
CONDITIONS POUR LE SCÉNARIO 3

Simulations H2D2	Date Production	Heure	Cas	Débit Némiskau	Débit affluent	Niveau du lac	Thermocline	Particularités
				mcs	mcs	m	m	Date
sim0016	2014-12-17	9h30	Scénario 3	61.8	4.2	273.47	260	2014-07-28

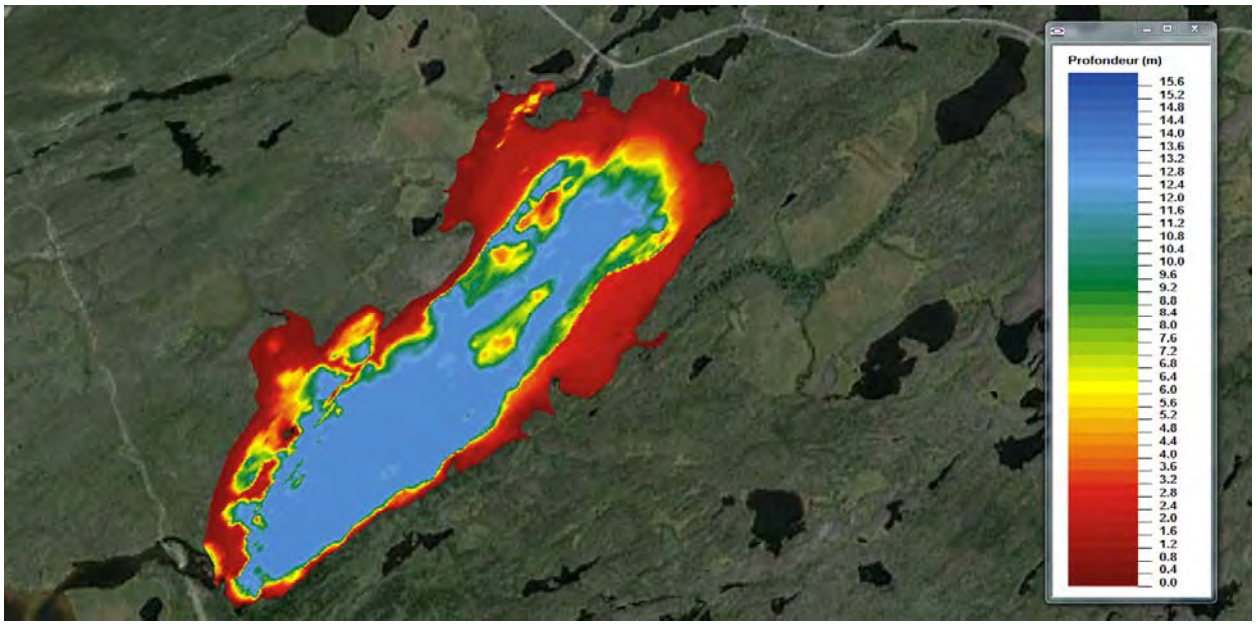
COTE DU FOND AVEC THERMOCLINE À 260 M



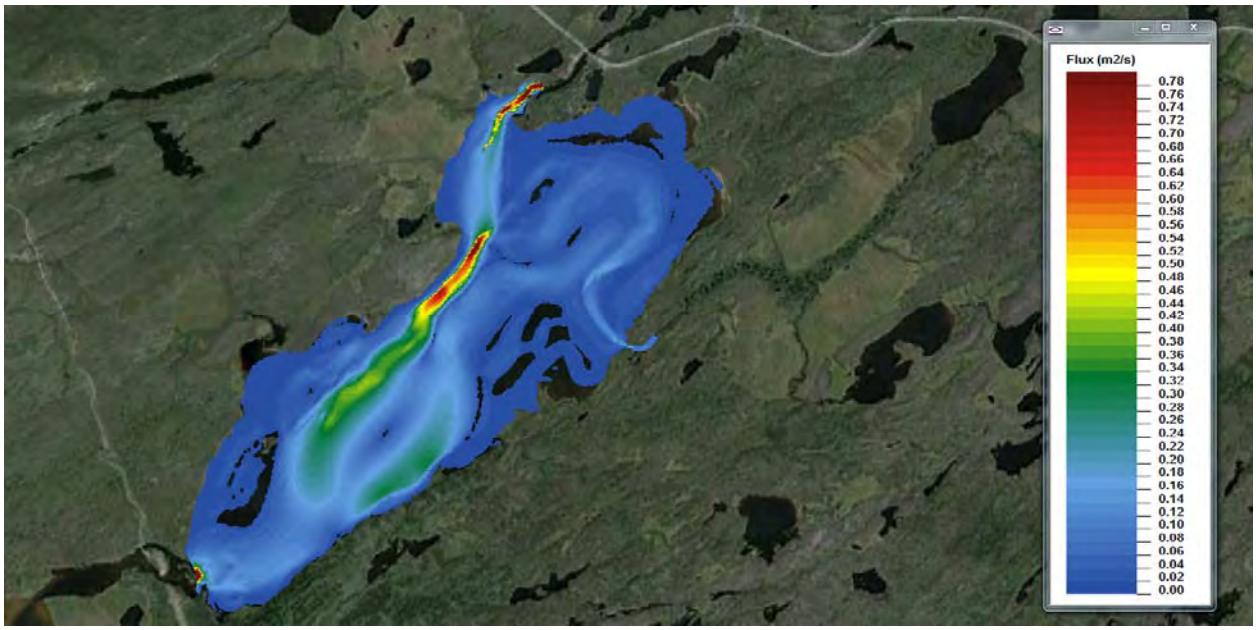
MODULE DE VITESSE



PROFONDEUR EFFECTIVE



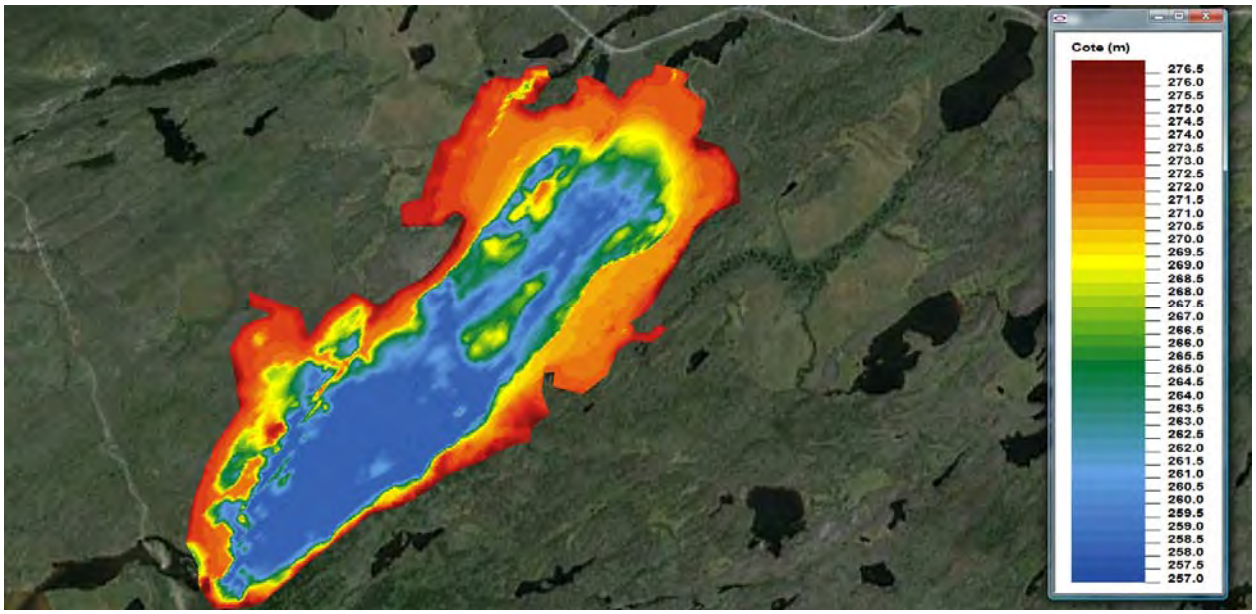
FLUX EFFECTIF



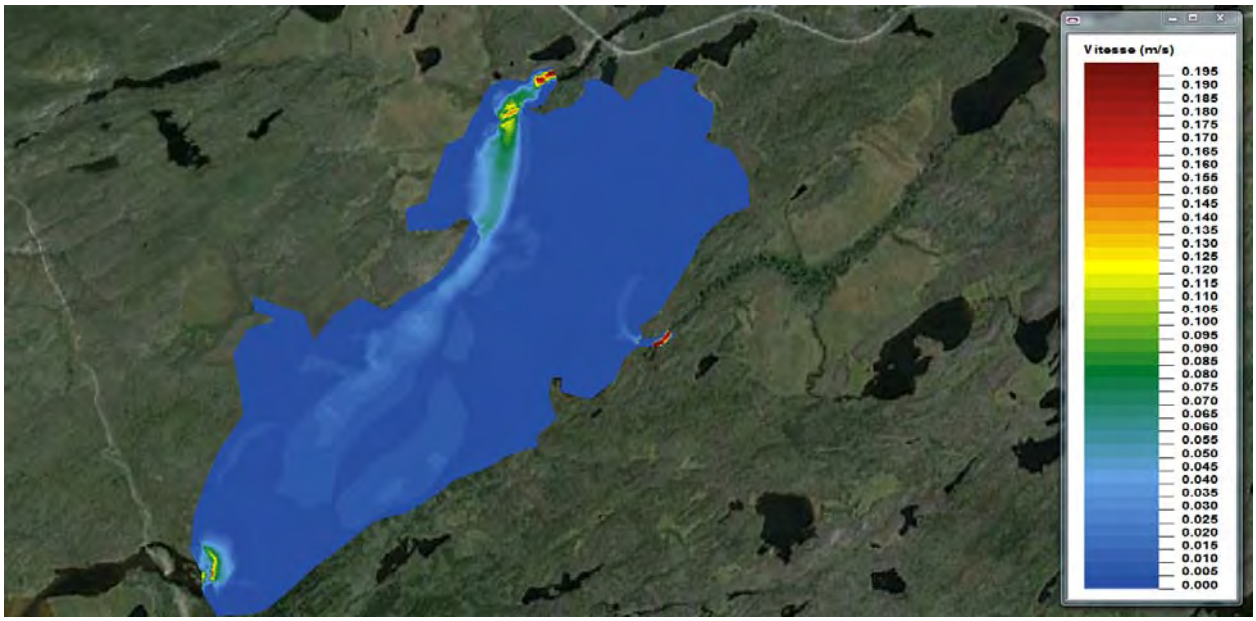
CONDITIONS POUR LE SCÉNARIO 4

Simulations H2D2	Date Production	Heure	Cas	Débit Némiskau	Débit affluent	Niveau du lac	Thermocline	Particularités
				mcs	mcs	m	m	Date
sim0017	2014-12-16	9h30	Scénario 4	26.6	0.9	273.01	258	2014-09-10

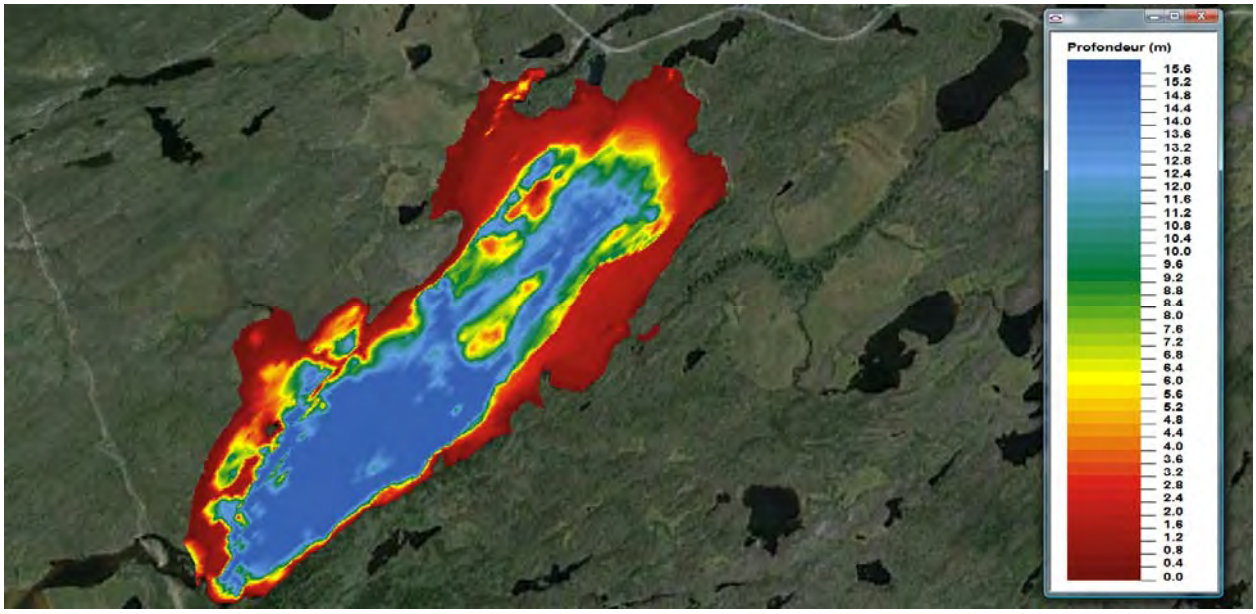
COTE DU FOND AVEC THERMOCLINE À 258 M



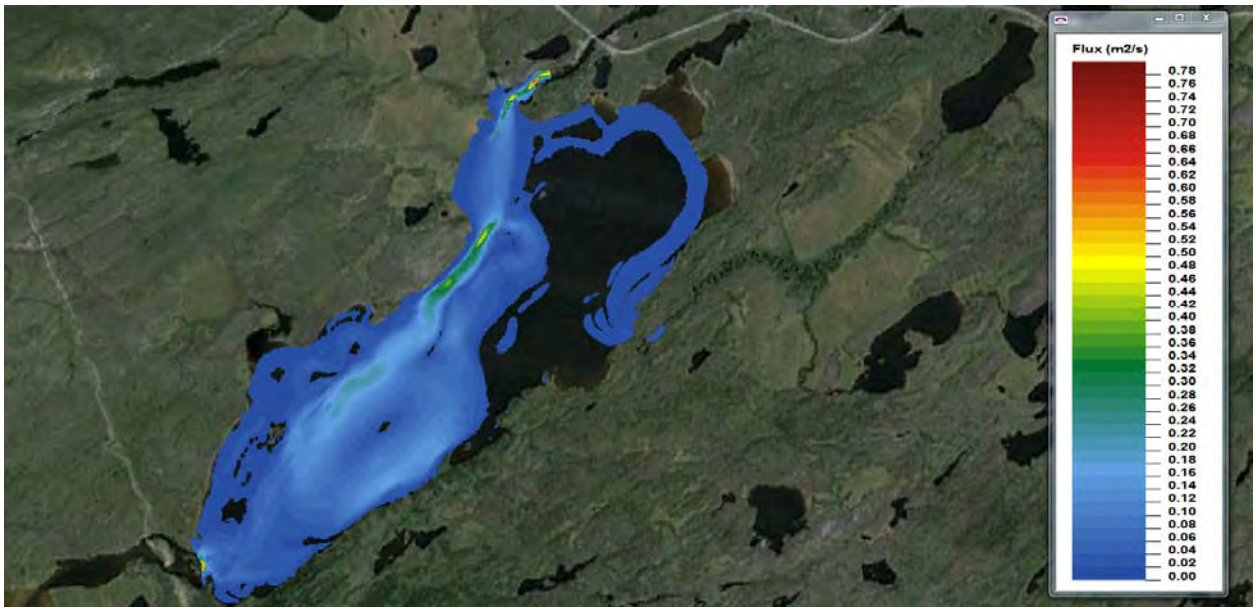
MODULE DE VITESSE



PROFONDEUR EFFECTIVE



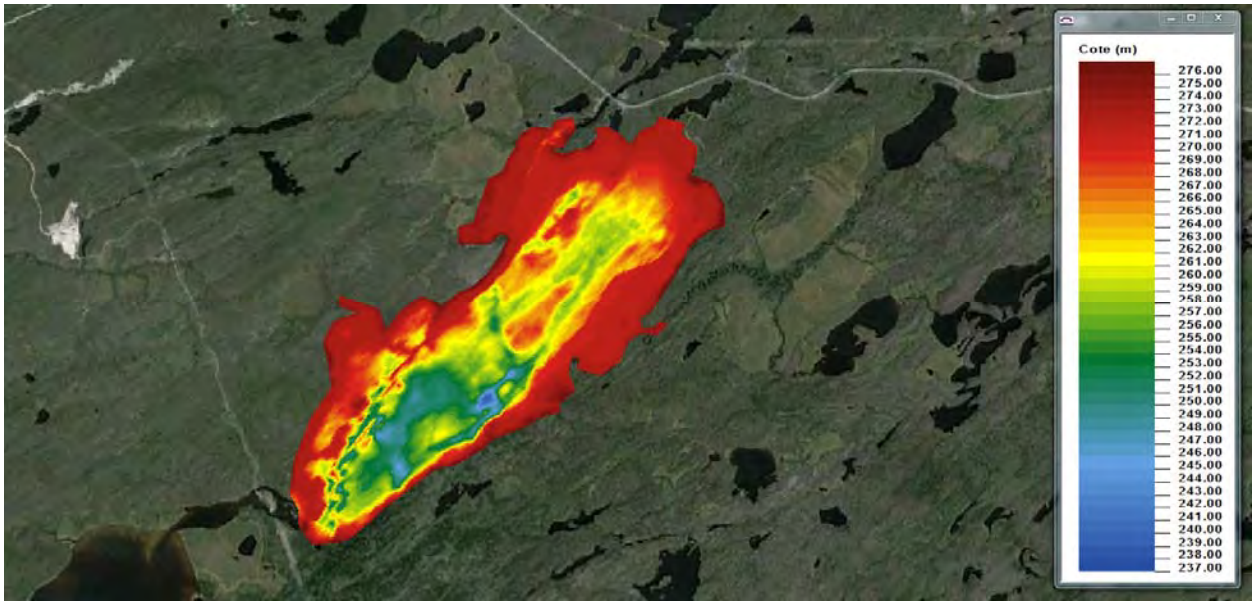
FLUX EFFECTIF



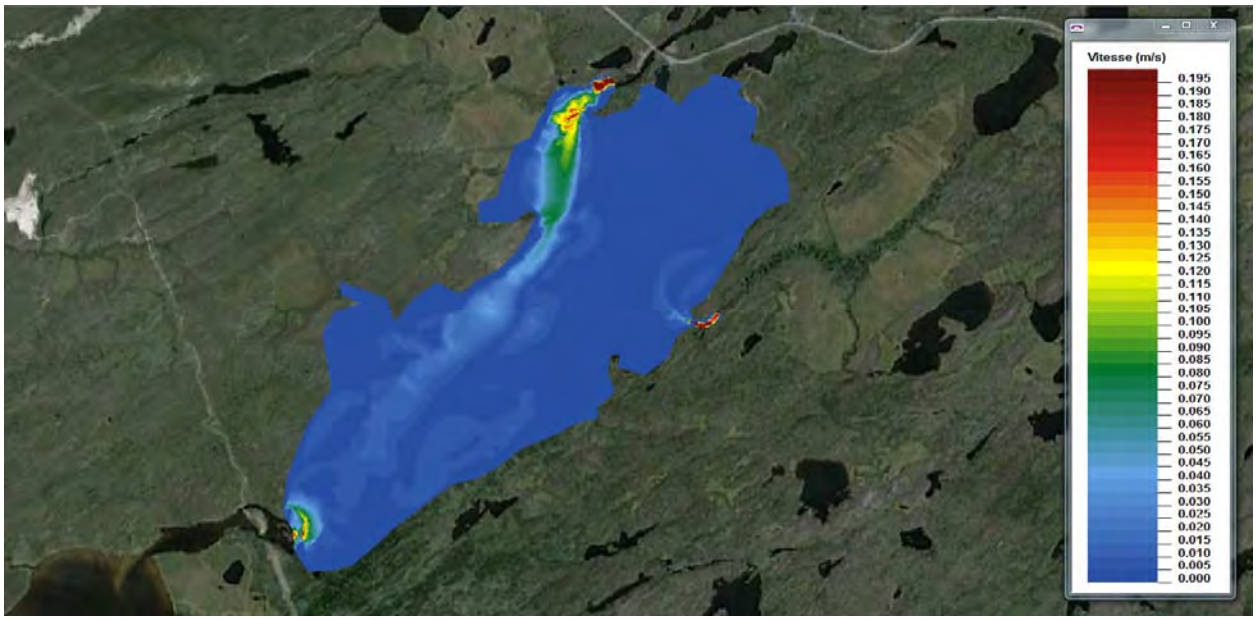
CONDITIONS POUR LE SCÉNARIO 5

Simulations H2D2	Date Production	Heure	Cas	Débit Némiskau	Débit affluent	Niveau du lac	Thermocline	Particularités
				mcs	mcs	m	m	Date
sim0018	2014-12-15	9h30	Scénario 5	39.7	1.2	273.18	absence	2014-10-05

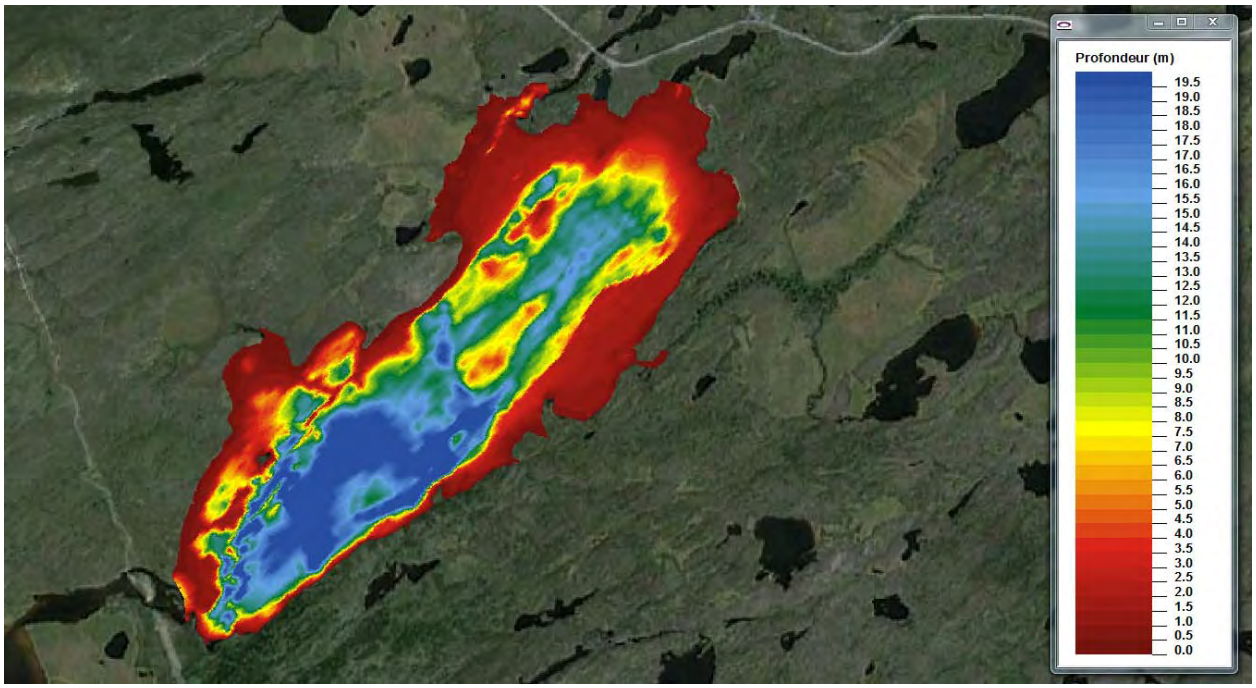
COTE DU FOND SANS THERMOCLINE



MODULE DE VITESSE

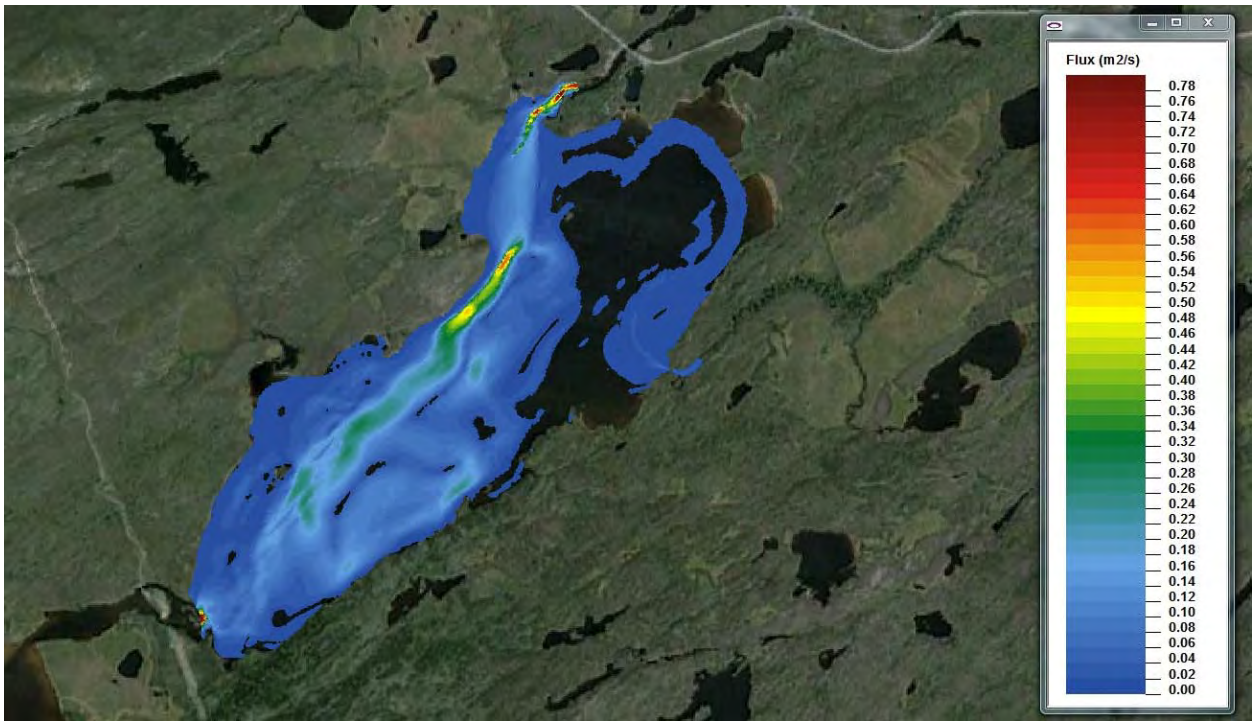


PROFONDEUR EFFECTIVE



FLUX EFFECTIF

Les zones sans couleur ont un flux inférieur à 0,01 m^2/s



Annexe B

RAPPORT DES MODÉLISATIONS CORMIX – EFFLUENT MINIER

CORMIX

PREDICTION FILE

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario1
 FILE NAME:         E:\Projets\Nemaska\Scenarios\1\S1_Q22lps.prd
 Time stamp:        Tue Dec 16 09:21:24 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3360.00  QA    =    403.20  ICHREG= 1
 HA    =      4.80  HD    =      4.80
 UA    =      0.120 F     =      0.005 USTAR =0.2894E-02
 UW    =      2.500 UWSTAR=0.2781E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.9430

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    183.35  YB1   =    125.00  YB2   =    241.70
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.55
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    128.90  THETA =      0.00  SIGMA =      3.90  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.9430  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.01
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      0.94  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      4.86  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      4.86
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 2222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.80  2
 2222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       183.35 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.464   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.50     0.10    0.38   301.3 0.332E+00   0.30    74.99 .15735E+02
```

2.99	0.20	0.52	425.7	0.235E+00	0.60	74.98	.31659E+02
4.49	0.31	0.65	521.1	0.192E+00	0.90	74.98	.47615E+02
5.99	0.41	0.79	601.6	0.166E+00	1.20	74.97	.63587E+02
7.48	0.51	0.92	672.5	0.149E+00	1.50	74.96	.79570E+02
8.98	0.61	1.06	736.6	0.136E+00	1.80	74.96	.95560E+02
10.48	0.71	1.19	795.5	0.126E+00	2.10	74.95	.11156E+03
11.97	0.82	1.33	850.4	0.118E+00	2.40	74.95	.12756E+03
13.47	0.92	1.46	901.9	0.111E+00	2.70	74.94	.14356E+03
14.97	1.02	1.59	950.6	0.105E+00	3.00	74.94	.15957E+03
16.46	1.12	1.73	997.0	0.100E+00	3.30	74.93	.17558E+03
17.96	1.22	1.86	1041.2	0.960E-01	3.60	74.93	.19159E+03
19.45	1.33	2.00	1083.7	0.923E-01	3.90	74.92	.20761E+03
20.95	1.43	2.13	1124.6	0.889E-01	4.20	74.92	.22362E+03
22.45	1.53	2.27	1164.0	0.859E-01	4.50	74.92	.23964E+03
23.94	1.63	2.40	1202.2	0.832E-01	4.80	74.91	.25566E+03
25.44	1.73	2.40	1239.1	0.807E-01	4.80	74.91	.27168E+03
26.94	1.84	2.40	1275.0	0.784E-01	4.80	74.91	.28770E+03
28.43	1.94	2.40	1310.0	0.763E-01	4.80	74.90	.30373E+03
29.93	2.04	2.40	1344.0	0.744E-01	4.80	74.90	.31975E+03
31.43	2.14	2.40	1377.1	0.726E-01	4.80	74.90	.33577E+03
32.92	2.24	2.40	1409.5	0.709E-01	4.80	74.90	.35180E+03
34.42	2.35	2.40	1441.2	0.694E-01	4.80	74.89	.36783E+03
35.92	2.45	2.40	1472.1	0.679E-01	4.80	74.89	.38385E+03
37.41	2.55	2.40	1502.5	0.666E-01	4.80	74.89	.39988E+03
38.91	2.65	2.40	1532.2	0.653E-01	4.80	74.89	.41591E+03
40.41	2.75	2.40	1561.4	0.640E-01	4.80	74.88	.43194E+03
41.90	2.86	2.40	1590.0	0.629E-01	4.80	74.88	.44797E+03
43.40	2.96	2.40	1618.1	0.618E-01	4.80	74.88	.46400E+03
44.90	3.06	2.40	1645.8	0.608E-01	4.80	74.88	.48003E+03
46.39	3.16	2.40	1673.0	0.598E-01	4.80	74.88	.49606E+03
47.89	3.26	2.40	1699.7	0.588E-01	4.80	74.87	.51210E+03
49.39	3.37	2.40	1699.7	0.588E-01	4.80	74.87	.52810E+03
50.88	3.47	2.40	1699.7	0.588E-01	4.80	74.87	.54410E+03
52.38	3.57	2.40	1699.7	0.588E-01	4.80	74.87	.56010E+03
53.87	3.67	2.40	1699.7	0.588E-01	4.80	74.87	.57611E+03
55.37	3.77	2.40	1699.7	0.588E-01	4.80	74.87	.59211E+03
56.87	3.88	2.40	1699.7	0.588E-01	4.80	74.87	.60811E+03
58.36	3.98	2.40	1699.7	0.588E-01	4.80	74.87	.62412E+03
59.86	4.08	2.40	1699.7	0.588E-01	4.80	74.87	.64012E+03
61.36	4.18	2.40	1699.7	0.588E-01	4.80	74.87	.65612E+03
62.85	4.28	2.40	1699.7	0.588E-01	4.80	74.87	.67213E+03
64.35	4.39	2.40	1699.7	0.588E-01	4.80	74.86	.68813E+03
65.85	4.49	2.40	1699.7	0.588E-01	4.80	74.86	.70413E+03
67.34	4.59	2.40	1699.7	0.588E-01	4.80	74.86	.72013E+03
68.84	4.69	2.40	1699.7	0.588E-01	4.80	74.86	.73614E+03
70.34	4.80	2.40	1699.7	0.588E-01	4.80	74.86	.75214E+03
71.83	4.90	2.40	1699.7	0.588E-01	4.80	74.86	.76814E+03
73.33	5.00	2.40	1699.7	0.588E-01	4.80	74.86	.78415E+03
74.83	5.10	2.40	1699.7	0.588E-01	4.80	74.86	.80015E+03

Cumulative travel time = 800.1493 sec (0.22 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.344E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.429E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.83	5.10	4.80	1699.7	0.588E-01	4.80	32.46	4.80	0.00	.80015E+03
213.33	5.10	4.80	1712.2	0.584E-01	4.80	32.70	4.80	0.00	.19543E+04
351.83	5.10	4.80	1724.7	0.580E-01	4.80	32.93	4.80	0.00	.31084E+04
490.34	5.10	4.80	1737.0	0.576E-01	4.80	33.17	4.80	0.00	.42625E+04
628.84	5.10	4.80	1749.2	0.572E-01	4.80	33.40	4.80	0.00	.54167E+04
767.34	5.10	4.80	1761.4	0.568E-01	4.80	33.64	4.80	0.00	.65708E+04
905.85	5.10	4.80	1773.5	0.564E-01	4.80	33.87	4.80	0.00	.77249E+04
1044.35	5.10	4.80	1785.5	0.560E-01	4.80	34.10	4.80	0.00	.88791E+04
1182.85	5.10	4.80	1797.4	0.556E-01	4.80	34.32	4.80	0.00	.10033E+05
1321.36	5.10	4.80	1809.2	0.553E-01	4.80	34.55	4.80	0.00	.11187E+05
1459.86	5.10	4.80	1821.0	0.549E-01	4.80	34.77	4.80	0.00	.12341E+05
1598.36	5.10	4.80	1832.7	0.546E-01	4.80	35.00	4.80	0.00	.13496E+05
1736.87	5.10	4.80	1844.3	0.542E-01	4.80	35.22	4.80	0.00	.14650E+05
1875.37	5.10	4.80	1855.8	0.539E-01	4.80	35.44	4.80	0.00	.15804E+05
2013.87	5.10	4.80	1867.3	0.536E-01	4.80	35.66	4.80	0.00	.16958E+05
2152.38	5.10	4.80	1878.7	0.532E-01	4.80	35.88	4.80	0.00	.18112E+05
2290.88	5.10	4.80	1890.0	0.529E-01	4.80	36.09	4.80	0.00	.19266E+05

2429.38	5.10	4.80	1901.3	0.526E-01	4.80	36.31	4.80	0.00	.20420E+05
2567.89	5.10	4.80	1912.5	0.523E-01	4.80	36.52	4.80	0.00	.21575E+05
2706.39	5.10	4.80	1923.6	0.520E-01	4.80	36.73	4.80	0.00	.22729E+05
2844.90	5.10	4.80	1934.7	0.517E-01	4.80	36.95	4.80	0.00	.23883E+05
2983.40	5.10	4.80	1945.7	0.514E-01	4.80	37.16	4.80	0.00	.25037E+05
3121.90	5.10	4.80	1956.6	0.511E-01	4.80	37.36	4.80	0.00	.26191E+05
3260.41	5.10	4.80	1967.5	0.508E-01	4.80	37.57	4.80	0.00	.27345E+05
3398.91	5.10	4.80	1978.3	0.505E-01	4.80	37.78	4.80	0.00	.28499E+05
3537.41	5.10	4.80	1989.1	0.503E-01	4.80	37.98	4.80	0.00	.29653E+05
3675.92	5.10	4.80	1999.8	0.500E-01	4.80	38.19	4.80	0.00	.30808E+05
3814.42	5.10	4.80	2010.4	0.497E-01	4.80	38.39	4.80	0.00	.31962E+05
3952.92	5.10	4.80	2021.0	0.495E-01	4.80	38.59	4.80	0.00	.33116E+05
4091.43	5.10	4.80	2031.6	0.492E-01	4.80	38.80	4.80	0.00	.34270E+05
4229.93	5.10	4.80	2042.1	0.490E-01	4.80	39.00	4.80	0.00	.35424E+05
4368.43	5.10	4.80	2052.5	0.487E-01	4.80	39.19	4.80	0.00	.36578E+05
4506.94	5.10	4.80	2062.9	0.485E-01	4.80	39.39	4.80	0.00	.37732E+05
4645.44	5.10	4.80	2073.2	0.482E-01	4.80	39.59	4.80	0.00	.38887E+05
4783.94	5.10	4.80	2083.5	0.480E-01	4.80	39.79	4.80	0.00	.40041E+05
4922.45	5.10	4.80	2093.7	0.478E-01	4.80	39.98	4.80	0.00	.41195E+05
5060.95	5.10	4.80	2103.8	0.475E-01	4.80	40.18	4.80	0.00	.42349E+05
5199.45	5.10	4.80	2114.0	0.473E-01	4.80	40.37	4.80	0.00	.43503E+05
5337.96	5.10	4.80	2124.0	0.471E-01	4.80	40.56	4.80	0.00	.44657E+05
5476.46	5.10	4.80	2134.1	0.469E-01	4.80	40.75	4.80	0.00	.45811E+05
5614.96	5.10	4.80	2144.1	0.466E-01	4.80	40.94	4.80	0.00	.46965E+05
5753.47	5.10	4.80	2154.0	0.464E-01	4.80	41.13	4.80	0.00	.48120E+05
5891.97	5.10	4.80	2163.9	0.462E-01	4.80	41.32	4.80	0.00	.49274E+05
6030.47	5.10	4.80	2173.7	0.460E-01	4.80	41.51	4.80	0.00	.50428E+05
6168.98	5.10	4.80	2183.5	0.458E-01	4.80	41.70	4.80	0.00	.51582E+05
6307.48	5.10	4.80	2193.3	0.456E-01	4.80	41.88	4.80	0.00	.52736E+05
6445.98	5.10	4.80	2203.0	0.454E-01	4.80	42.07	4.80	0.00	.53890E+05
6584.49	5.10	4.80	2212.7	0.452E-01	4.80	42.25	4.80	0.00	.55044E+05
6722.99	5.10	4.80	2222.3	0.450E-01	4.80	42.44	4.80	0.00	.56198E+05
6861.49	5.10	4.80	2231.9	0.448E-01	4.80	42.62	4.80	0.00	.57353E+05
7000.00	5.10	4.80	2241.4	0.446E-01	4.80	42.80	4.80	0.00	.58507E+05

Cumulative travel time = 58506.7812 sec (16.25 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario1
 FILE NAME:         E:\Projets\Nemaska\Scenarios\1\S1_Q40lps.prd
 Time stamp:        Tue Dec 16 09:22:31 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3360.00  QA    =    403.20  ICHREG= 1
 HA    =      4.80  HD    =      4.80
 UA    =      0.120 F     =      0.005 USTAR =0.2894E-02
 UW    =      2.500 UWSTAR=0.2781E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.9430

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    183.35  YB1   =    125.00  YB2   =    241.70
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.55
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    128.90  THETA =      0.00  SIGMA =      3.90  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.9430  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.72  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      8.84  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      8.84
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.80  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       183.35 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.941   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.50     0.10    0.38   166.5 0.601E+00   0.30    74.97 .15036E+02
```

2.99	0.20	0.52	235.0	0.426E+00	0.60	74.95	.30642E+02
4.49	0.31	0.65	287.6	0.348E+00	0.90	74.93	.46354E+02
5.99	0.41	0.79	331.9	0.301E+00	1.20	74.90	.62121E+02
7.48	0.51	0.92	371.0	0.270E+00	1.50	74.88	.77923E+02
8.98	0.61	1.06	406.3	0.246E+00	1.80	74.86	.93749E+02
10.48	0.71	1.19	438.8	0.228E+00	2.10	74.85	.10960E+03
11.97	0.82	1.33	469.0	0.213E+00	2.40	74.83	.12546E+03
13.47	0.92	1.46	497.4	0.201E+00	2.70	74.81	.14133E+03
14.97	1.02	1.59	524.3	0.191E+00	3.00	74.80	.15721E+03
16.46	1.12	1.73	549.8	0.182E+00	3.30	74.78	.17310E+03
17.96	1.22	1.86	574.2	0.174E+00	3.60	74.77	.18900E+03
19.45	1.33	2.00	597.6	0.167E+00	3.90	74.75	.20491E+03
20.95	1.43	2.13	620.1	0.161E+00	4.20	74.74	.22082E+03
22.45	1.53	2.27	641.9	0.156E+00	4.50	74.73	.23674E+03
23.94	1.63	2.40	662.9	0.151E+00	4.80	74.72	.25266E+03
25.44	1.73	2.40	683.2	0.146E+00	4.80	74.71	.26858E+03
26.94	1.84	2.40	703.0	0.142E+00	4.80	74.70	.28451E+03
28.43	1.94	2.40	722.3	0.138E+00	4.80	74.69	.30045E+03
29.93	2.04	2.40	741.0	0.135E+00	4.80	74.68	.31639E+03
31.43	2.14	2.40	759.3	0.132E+00	4.80	74.67	.33233E+03
32.92	2.24	2.40	777.1	0.129E+00	4.80	74.66	.34827E+03
34.42	2.35	2.40	794.6	0.126E+00	4.80	74.65	.36421E+03
35.92	2.45	2.40	811.6	0.123E+00	4.80	74.64	.38016E+03
37.41	2.55	2.40	828.3	0.121E+00	4.80	74.63	.39611E+03
38.91	2.65	2.40	844.7	0.118E+00	4.80	74.63	.41207E+03
40.41	2.75	2.40	860.8	0.116E+00	4.80	74.62	.42802E+03
41.90	2.86	2.40	876.6	0.114E+00	4.80	74.61	.44398E+03
43.40	2.96	2.40	892.1	0.112E+00	4.80	74.61	.45994E+03
44.90	3.06	2.40	907.3	0.110E+00	4.80	74.60	.47590E+03
46.39	3.16	2.40	922.3	0.108E+00	4.80	74.60	.49186E+03
47.89	3.26	2.40	937.0	0.107E+00	4.80	74.59	.50782E+03
49.39	3.37	2.40	937.0	0.107E+00	4.80	74.59	.52369E+03
50.88	3.47	2.40	937.0	0.107E+00	4.80	74.58	.53956E+03
52.38	3.57	2.40	937.0	0.107E+00	4.80	74.58	.55543E+03
53.87	3.67	2.40	937.0	0.107E+00	4.80	74.57	.57130E+03
55.37	3.77	2.40	937.0	0.107E+00	4.80	74.57	.58717E+03
56.87	3.88	2.40	937.0	0.107E+00	4.80	74.57	.60304E+03
58.36	3.98	2.40	937.0	0.107E+00	4.80	74.57	.61891E+03
59.86	4.08	2.40	937.0	0.107E+00	4.80	74.56	.63478E+03
61.36	4.18	2.40	937.0	0.107E+00	4.80	74.56	.65065E+03
62.85	4.28	2.40	937.0	0.107E+00	4.80	74.56	.66652E+03
64.35	4.39	2.40	937.0	0.107E+00	4.80	74.56	.68238E+03
65.85	4.49	2.40	937.0	0.107E+00	4.80	74.56	.69825E+03
67.34	4.59	2.40	937.0	0.107E+00	4.80	74.55	.71412E+03
68.84	4.69	2.40	937.0	0.107E+00	4.80	74.55	.72999E+03
70.34	4.80	2.40	937.0	0.107E+00	4.80	74.55	.74586E+03
71.83	4.90	2.40	937.0	0.107E+00	4.80	74.55	.76173E+03
73.33	5.00	2.40	937.0	0.107E+00	4.80	74.55	.77760E+03
74.83	5.10	2.40	937.0	0.107E+00	4.80	74.55	.79347E+03

Cumulative travel time = 793.4702 sec (0.22 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.344E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.429E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.83	5.10	4.80	937.0	0.107E+00	4.80	32.53	4.80	0.00	.79347E+03
213.33	5.10	4.80	943.9	0.106E+00	4.80	32.77	4.80	0.00	.19476E+04
351.83	5.10	4.80	950.7	0.105E+00	4.80	33.01	4.80	0.00	.31016E+04
490.34	5.10	4.80	957.5	0.104E+00	4.80	33.24	4.80	0.00	.42557E+04
628.84	5.10	4.80	964.2	0.104E+00	4.80	33.48	4.80	0.00	.54098E+04
767.34	5.10	4.80	970.9	0.103E+00	4.80	33.71	4.80	0.00	.65639E+04
905.85	5.10	4.80	977.5	0.102E+00	4.80	33.94	4.80	0.00	.77180E+04
1044.35	5.10	4.80	984.1	0.102E+00	4.80	34.17	4.80	0.00	.88720E+04
1182.85	5.10	4.80	990.6	0.101E+00	4.80	34.39	4.80	0.00	.10026E+05
1321.36	5.10	4.80	997.1	0.100E+00	4.80	34.62	4.80	0.00	.11180E+05
1459.86	5.10	4.80	1003.6	0.996E-01	4.80	34.84	4.80	0.00	.12334E+05
1598.36	5.10	4.80	1010.0	0.990E-01	4.80	35.07	4.80	0.00	.13488E+05
1736.87	5.10	4.80	1016.4	0.984E-01	4.80	35.29	4.80	0.00	.14642E+05
1875.37	5.10	4.80	1022.7	0.978E-01	4.80	35.51	4.80	0.00	.15797E+05
2013.87	5.10	4.80	1029.0	0.972E-01	4.80	35.73	4.80	0.00	.16951E+05
2152.38	5.10	4.80	1035.3	0.966E-01	4.80	35.94	4.80	0.00	.18105E+05
2290.88	5.10	4.80	1041.5	0.960E-01	4.80	36.16	4.80	0.00	.19259E+05

2429.38	5.10	4.80	1047.7	0.954E-01	4.80	36.37	4.80	0.00	.20413E+05
2567.89	5.10	4.80	1053.8	0.949E-01	4.80	36.59	4.80	0.00	.21567E+05
2706.39	5.10	4.80	1059.9	0.943E-01	4.80	36.80	4.80	0.00	.22721E+05
2844.90	5.10	4.80	1066.0	0.938E-01	4.80	37.01	4.80	0.00	.23875E+05
2983.40	5.10	4.80	1072.0	0.933E-01	4.80	37.22	4.80	0.00	.25029E+05
3121.90	5.10	4.80	1078.1	0.928E-01	4.80	37.43	4.80	0.00	.26183E+05
3260.41	5.10	4.80	1084.0	0.922E-01	4.80	37.64	4.80	0.00	.27337E+05
3398.91	5.10	4.80	1090.0	0.917E-01	4.80	37.84	4.80	0.00	.28491E+05
3537.41	5.10	4.80	1095.9	0.913E-01	4.80	38.05	4.80	0.00	.29645E+05
3675.92	5.10	4.80	1101.8	0.908E-01	4.80	38.25	4.80	0.00	.30800E+05
3814.42	5.10	4.80	1107.6	0.903E-01	4.80	38.45	4.80	0.00	.31954E+05
3952.92	5.10	4.80	1113.4	0.898E-01	4.80	38.66	4.80	0.00	.33108E+05
4091.43	5.10	4.80	1119.2	0.893E-01	4.80	38.86	4.80	0.00	.34262E+05
4229.93	5.10	4.80	1125.0	0.889E-01	4.80	39.06	4.80	0.00	.35416E+05
4368.43	5.10	4.80	1130.7	0.884E-01	4.80	39.26	4.80	0.00	.36570E+05
4506.94	5.10	4.80	1136.4	0.880E-01	4.80	39.45	4.80	0.00	.37724E+05
4645.44	5.10	4.80	1142.1	0.876E-01	4.80	39.65	4.80	0.00	.38878E+05
4783.94	5.10	4.80	1147.7	0.871E-01	4.80	39.85	4.80	0.00	.40032E+05
4922.45	5.10	4.80	1153.3	0.867E-01	4.80	40.04	4.80	0.00	.41186E+05
5060.95	5.10	4.80	1158.9	0.863E-01	4.80	40.24	4.80	0.00	.42340E+05
5199.45	5.10	4.80	1164.5	0.859E-01	4.80	40.43	4.80	0.00	.43494E+05
5337.96	5.10	4.80	1170.0	0.855E-01	4.80	40.62	4.80	0.00	.44649E+05
5476.46	5.10	4.80	1175.5	0.851E-01	4.80	40.81	4.80	0.00	.45803E+05
5614.96	5.10	4.80	1181.0	0.847E-01	4.80	41.00	4.80	0.00	.46957E+05
5753.47	5.10	4.80	1186.4	0.843E-01	4.80	41.19	4.80	0.00	.48111E+05
5891.97	5.10	4.80	1191.9	0.839E-01	4.80	41.38	4.80	0.00	.49265E+05
6030.47	5.10	4.80	1197.3	0.835E-01	4.80	41.57	4.80	0.00	.50419E+05
6168.98	5.10	4.80	1202.7	0.831E-01	4.80	41.75	4.80	0.00	.51573E+05
6307.48	5.10	4.80	1208.0	0.828E-01	4.80	41.94	4.80	0.00	.52727E+05
6445.98	5.10	4.80	1213.3	0.824E-01	4.80	42.13	4.80	0.00	.53881E+05
6584.49	5.10	4.80	1218.7	0.821E-01	4.80	42.31	4.80	0.00	.55035E+05
6722.99	5.10	4.80	1223.9	0.817E-01	4.80	42.49	4.80	0.00	.56189E+05
6861.49	5.10	4.80	1229.2	0.814E-01	4.80	42.68	4.80	0.00	.57343E+05
7000.00	5.10	4.80	1234.5	0.810E-01	4.80	42.86	4.80	0.00	.58498E+05

Cumulative travel time = 58497.5273 sec (16.25 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario1
 FILE NAME:         E:\Projets\Nemaska\Scenarios\1\S1_Q62lps.prd
 Time stamp:        Tue Dec 16 09:23:16 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3360.00  QA    =    403.20  ICHREG= 1
 HA    =      4.80  HD    =      4.80
 UA    =      0.120 F     =      0.005 USTAR =0.2894E-02
 UW    =      2.500 UWSTAR=0.2781E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.9430

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    183.35  YB1   =    125.00  YB2   =    241.70
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.55
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    128.90  THETA =      0.00  SIGMA =      3.90  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.9430  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.05
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.66  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     13.71  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     13.71
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.80  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       183.35 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.525   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.50     0.10    0.38   108.2 0.924E+00   0.30    74.94 .13813E+02
```

2.99	0.20	0.52	152.6	0.655E+00	0.60	74.88	.28800E+02
4.49	0.31	0.65	186.7	0.536E+00	0.90	74.83	.44031E+02
5.99	0.41	0.79	215.4	0.464E+00	1.20	74.77	.59391E+02
7.48	0.51	0.92	240.7	0.415E+00	1.50	74.73	.74834E+02
8.98	0.61	1.06	263.6	0.379E+00	1.80	74.68	.90335E+02
10.48	0.71	1.19	284.6	0.351E+00	2.10	74.64	.10588E+03
11.97	0.82	1.33	304.2	0.329E+00	2.40	74.60	.12146E+03
13.47	0.92	1.46	322.6	0.310E+00	2.70	74.56	.13707E+03
14.97	1.02	1.59	340.0	0.294E+00	3.00	74.52	.15271E+03
16.46	1.12	1.73	356.5	0.280E+00	3.30	74.49	.16836E+03
17.96	1.22	1.86	372.3	0.269E+00	3.60	74.45	.18404E+03
19.45	1.33	2.00	387.5	0.258E+00	3.90	74.42	.19973E+03
20.95	1.43	2.13	402.1	0.249E+00	4.20	74.39	.21543E+03
22.45	1.53	2.27	416.1	0.240E+00	4.50	74.36	.23115E+03
23.94	1.63	2.40	429.8	0.233E+00	4.80	74.34	.24687E+03
25.44	1.73	2.40	443.0	0.226E+00	4.80	74.31	.26261E+03
26.94	1.84	2.40	455.8	0.219E+00	4.80	74.28	.27836E+03
28.43	1.94	2.40	468.2	0.214E+00	4.80	74.26	.29411E+03
29.93	2.04	2.40	480.4	0.208E+00	4.80	74.24	.30988E+03
31.43	2.14	2.40	492.2	0.203E+00	4.80	74.22	.32565E+03
32.92	2.24	2.40	503.8	0.199E+00	4.80	74.20	.34142E+03
34.42	2.35	2.40	515.1	0.194E+00	4.80	74.18	.35721E+03
35.92	2.45	2.40	526.1	0.190E+00	4.80	74.16	.37300E+03
37.41	2.55	2.40	537.0	0.186E+00	4.80	74.14	.38879E+03
38.91	2.65	2.40	547.6	0.183E+00	4.80	74.12	.40460E+03
40.41	2.75	2.40	558.0	0.179E+00	4.80	74.11	.42040E+03
41.90	2.86	2.40	568.2	0.176E+00	4.80	74.09	.43621E+03
43.40	2.96	2.40	578.2	0.173E+00	4.80	74.08	.45203E+03
44.90	3.06	2.40	588.1	0.170E+00	4.80	74.06	.46785E+03
46.39	3.16	2.40	597.8	0.167E+00	4.80	74.05	.48367E+03
47.89	3.26	2.40	607.4	0.165E+00	4.80	74.04	.49950E+03
49.39	3.37	2.40	607.4	0.165E+00	4.80	74.03	.51510E+03
50.88	3.47	2.40	607.4	0.165E+00	4.80	74.02	.53071E+03
52.38	3.57	2.40	607.4	0.165E+00	4.80	74.01	.54632E+03
53.87	3.67	2.40	607.4	0.165E+00	4.80	74.00	.56193E+03
55.37	3.77	2.40	607.4	0.165E+00	4.80	73.99	.57754E+03
56.87	3.88	2.40	607.4	0.165E+00	4.80	73.98	.59315E+03
58.36	3.98	2.40	607.4	0.165E+00	4.80	73.98	.60876E+03
59.86	4.08	2.40	607.4	0.165E+00	4.80	73.97	.62437E+03
61.36	4.18	2.40	607.4	0.165E+00	4.80	73.97	.63998E+03
62.85	4.28	2.40	607.4	0.165E+00	4.80	73.96	.65559E+03
64.35	4.39	2.40	607.4	0.165E+00	4.80	73.96	.67120E+03
65.85	4.49	2.40	607.4	0.165E+00	4.80	73.96	.68681E+03
67.34	4.59	2.40	607.4	0.165E+00	4.80	73.95	.70242E+03
68.84	4.69	2.40	607.4	0.165E+00	4.80	73.95	.71802E+03
70.34	4.80	2.40	607.4	0.165E+00	4.80	73.95	.73363E+03
71.83	4.90	2.40	607.4	0.165E+00	4.80	73.95	.74924E+03
73.33	5.00	2.40	607.4	0.165E+00	4.80	73.95	.76485E+03
74.83	5.10	2.40	607.4	0.165E+00	4.80	73.95	.78046E+03

Cumulative travel time = 780.4619 sec (0.22 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.344E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.429E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.83	5.10	4.80	607.4	0.165E+00	4.80	32.68	4.80	0.00	.78046E+03
213.33	5.10	4.80	611.8	0.163E+00	4.80	32.92	4.80	0.00	.19345E+04
351.83	5.10	4.80	616.2	0.162E+00	4.80	33.16	4.80	0.00	.30885E+04
490.34	5.10	4.80	620.5	0.161E+00	4.80	33.39	4.80	0.00	.42425E+04
628.84	5.10	4.80	624.8	0.160E+00	4.80	33.62	4.80	0.00	.53965E+04
767.34	5.10	4.80	629.1	0.159E+00	4.80	33.85	4.80	0.00	.65506E+04
905.85	5.10	4.80	633.4	0.158E+00	4.80	34.08	4.80	0.00	.77046E+04
1044.35	5.10	4.80	637.6	0.157E+00	4.80	34.31	4.80	0.00	.88586E+04
1182.85	5.10	4.80	641.8	0.156E+00	4.80	34.54	4.80	0.00	.10013E+05
1321.36	5.10	4.80	646.0	0.155E+00	4.80	34.76	4.80	0.00	.11167E+05
1459.86	5.10	4.80	650.1	0.154E+00	4.80	34.98	4.80	0.00	.12321E+05
1598.36	5.10	4.80	654.2	0.153E+00	4.80	35.21	4.80	0.00	.13475E+05
1736.87	5.10	4.80	658.3	0.152E+00	4.80	35.43	4.80	0.00	.14629E+05
1875.37	5.10	4.80	662.4	0.151E+00	4.80	35.65	4.80	0.00	.15783E+05
2013.87	5.10	4.80	666.5	0.150E+00	4.80	35.86	4.80	0.00	.16937E+05
2152.38	5.10	4.80	670.5	0.149E+00	4.80	36.08	4.80	0.00	.18091E+05
2290.88	5.10	4.80	674.5	0.148E+00	4.80	36.29	4.80	0.00	.19245E+05

2429.38	5.10	4.80	678.4	0.147E+00	4.80	36.51	4.80	0.00	.20399E+05
2567.89	5.10	4.80	682.4	0.147E+00	4.80	36.72	4.80	0.00	.21553E+05
2706.39	5.10	4.80	686.3	0.146E+00	4.80	36.93	4.80	0.00	.22707E+05
2844.90	5.10	4.80	690.2	0.145E+00	4.80	37.14	4.80	0.00	.23861E+05
2983.40	5.10	4.80	694.1	0.144E+00	4.80	37.35	4.80	0.00	.25015E+05
3121.90	5.10	4.80	698.0	0.143E+00	4.80	37.56	4.80	0.00	.26169E+05
3260.41	5.10	4.80	701.8	0.142E+00	4.80	37.77	4.80	0.00	.27323E+05
3398.91	5.10	4.80	705.6	0.142E+00	4.80	37.97	4.80	0.00	.28477E+05
3537.41	5.10	4.80	709.4	0.141E+00	4.80	38.18	4.80	0.00	.29631E+05
3675.92	5.10	4.80	713.2	0.140E+00	4.80	38.38	4.80	0.00	.30785E+05
3814.42	5.10	4.80	717.0	0.139E+00	4.80	38.58	4.80	0.00	.31939E+05
3952.92	5.10	4.80	720.7	0.139E+00	4.80	38.78	4.80	0.00	.33093E+05
4091.43	5.10	4.80	724.4	0.138E+00	4.80	38.98	4.80	0.00	.34247E+05
4229.93	5.10	4.80	728.1	0.137E+00	4.80	39.18	4.80	0.00	.35401E+05
4368.43	5.10	4.80	731.8	0.137E+00	4.80	39.38	4.80	0.00	.36555E+05
4506.94	5.10	4.80	735.5	0.136E+00	4.80	39.58	4.80	0.00	.37709E+05
4645.44	5.10	4.80	739.1	0.135E+00	4.80	39.77	4.80	0.00	.38863E+05
4783.94	5.10	4.80	742.8	0.135E+00	4.80	39.97	4.80	0.00	.40017E+05
4922.45	5.10	4.80	746.4	0.134E+00	4.80	40.16	4.80	0.00	.41171E+05
5060.95	5.10	4.80	750.0	0.133E+00	4.80	40.36	4.80	0.00	.42325E+05
5199.45	5.10	4.80	753.5	0.133E+00	4.80	40.55	4.80	0.00	.43479E+05
5337.96	5.10	4.80	757.1	0.132E+00	4.80	40.74	4.80	0.00	.44633E+05
5476.46	5.10	4.80	760.6	0.131E+00	4.80	40.93	4.80	0.00	.45787E+05
5614.96	5.10	4.80	764.2	0.131E+00	4.80	41.12	4.80	0.00	.46941E+05
5753.47	5.10	4.80	767.7	0.130E+00	4.80	41.31	4.80	0.00	.48095E+05
5891.97	5.10	4.80	771.2	0.130E+00	4.80	41.50	4.80	0.00	.49249E+05
6030.47	5.10	4.80	774.7	0.129E+00	4.80	41.68	4.80	0.00	.50403E+05
6168.98	5.10	4.80	778.1	0.129E+00	4.80	41.87	4.80	0.00	.51557E+05
6307.48	5.10	4.80	781.6	0.128E+00	4.80	42.06	4.80	0.00	.52711E+05
6445.98	5.10	4.80	785.0	0.127E+00	4.80	42.24	4.80	0.00	.53865E+05
6584.49	5.10	4.80	788.4	0.127E+00	4.80	42.43	4.80	0.00	.55019E+05
6722.99	5.10	4.80	791.8	0.126E+00	4.80	42.61	4.80	0.00	.56173E+05
6861.49	5.10	4.80	795.2	0.126E+00	4.80	42.79	4.80	0.00	.57327E+05
7000.00	5.10	4.80	798.6	0.125E+00	4.80	42.97	4.80	0.00	.58481E+05

```
 Cumulative travel time =       58481.3711 sec  (   16.24 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario2
 FILE NAME:         E:\Projets\Nemaska\Scenarios\2\S2_Q22lps.prd
 Time stamp:        Tue Dec 16 09:24:37 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3220.00  QA    =    357.42  ICHREG= 1
 HA    =      4.60  HD    =      4.60
 UA    =      0.111 F     =      0.005 USTAR =0.2696E-02
 UW    =      1.800 UWSTAR=0.1968E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.2460

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    182.30  YB1   =    125.00  YB2   =    239.60
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.35
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    130.20  THETA =      0.00  SIGMA =      5.20  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.2460  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.01
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.02  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.26  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.26
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.60  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       182.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.473   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.60m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.14    0.38   267.9 0.373E+00   0.30    74.99 .17249E+02
```

2.99	0.27	0.52	378.5	0.264E+00	0.60	74.98	.34753E+02
4.48	0.41	0.65	463.3	0.216E+00	0.90	74.97	.52301E+02
5.98	0.54	0.78	534.8	0.187E+00	1.20	74.96	.69871E+02
7.47	0.68	0.92	597.9	0.167E+00	1.50	74.95	.87456E+02
8.96	0.82	1.05	654.8	0.153E+00	1.80	74.95	.10505E+03
10.46	0.95	1.19	707.2	0.141E+00	2.10	74.94	.12265E+03
11.95	1.09	1.32	756.0	0.132E+00	2.40	74.93	.14026E+03
13.44	1.22	1.45	801.8	0.125E+00	2.70	74.93	.15788E+03
14.94	1.36	1.59	845.1	0.118E+00	3.00	74.92	.17550E+03
16.43	1.50	1.72	886.3	0.113E+00	3.30	74.92	.19312E+03
17.93	1.63	1.85	925.7	0.108E+00	3.60	74.91	.21074E+03
19.42	1.77	1.99	963.4	0.104E+00	3.90	74.90	.22837E+03
20.91	1.90	2.12	999.7	0.100E+00	4.20	74.90	.24600E+03
22.41	2.04	2.26	1034.8	0.966E-01	4.50	74.90	.26363E+03
23.90	2.18	2.30	1068.7	0.936E-01	4.60	74.89	.28127E+03
25.40	2.31	2.30	1101.6	0.908E-01	4.60	74.89	.29891E+03
26.89	2.45	2.30	1133.5	0.882E-01	4.60	74.88	.31654E+03
28.38	2.58	2.30	1164.5	0.859E-01	4.60	74.88	.33418E+03
29.88	2.72	2.30	1194.7	0.837E-01	4.60	74.87	.35182E+03
31.37	2.85	2.30	1224.2	0.817E-01	4.60	74.87	.36947E+03
32.86	2.99	2.30	1253.0	0.798E-01	4.60	74.87	.38711E+03
34.36	3.13	2.30	1281.1	0.781E-01	4.60	74.86	.40475E+03
35.85	3.26	2.30	1308.7	0.764E-01	4.60	74.86	.42240E+03
37.35	3.40	2.30	1335.6	0.749E-01	4.60	74.86	.44005E+03
38.84	3.53	2.30	1362.1	0.734E-01	4.60	74.86	.45769E+03
40.33	3.67	2.30	1388.0	0.720E-01	4.60	74.85	.47534E+03
41.83	3.81	2.30	1413.4	0.707E-01	4.60	74.85	.49299E+03
43.32	3.94	2.30	1438.4	0.695E-01	4.60	74.85	.51064E+03
44.81	4.08	2.30	1463.0	0.684E-01	4.60	74.85	.52829E+03
46.31	4.21	2.30	1479.2	0.676E-01	4.60	74.84	.54593E+03
47.80	4.35	2.30	1479.2	0.676E-01	4.60	74.84	.56354E+03
49.30	4.49	2.30	1479.2	0.676E-01	4.60	74.84	.58115E+03
50.79	4.62	2.30	1479.2	0.676E-01	4.60	74.84	.59876E+03
52.28	4.76	2.30	1479.2	0.676E-01	4.60	74.84	.61637E+03
53.78	4.89	2.30	1479.2	0.676E-01	4.60	74.84	.63398E+03
55.27	5.03	2.30	1479.2	0.676E-01	4.60	74.83	.65159E+03
56.77	5.17	2.30	1479.2	0.676E-01	4.60	74.83	.66920E+03
58.26	5.30	2.30	1479.2	0.676E-01	4.60	74.83	.68681E+03
59.75	5.44	2.30	1479.2	0.676E-01	4.60	74.83	.70442E+03
61.25	5.57	2.30	1479.2	0.676E-01	4.60	74.83	.72204E+03
62.74	5.71	2.30	1479.2	0.676E-01	4.60	74.83	.73965E+03
64.23	5.85	2.30	1479.2	0.676E-01	4.60	74.83	.75726E+03
65.73	5.98	2.30	1479.2	0.676E-01	4.60	74.83	.77487E+03
67.22	6.12	2.30	1479.2	0.676E-01	4.60	74.83	.79248E+03
68.72	6.25	2.30	1479.2	0.676E-01	4.60	74.83	.81009E+03
70.21	6.39	2.30	1479.2	0.676E-01	4.60	74.83	.82770E+03
71.70	6.53	2.30	1479.2	0.676E-01	4.60	74.83	.84531E+03
73.20	6.66	2.30	1479.2	0.676E-01	4.60	74.83	.86292E+03
74.69	6.80	2.30	1479.2	0.676E-01	4.60	74.83	.88053E+03

Cumulative travel time = 880.5309 sec (0.24 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.277E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.346E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.69	6.80	4.60	1479.2	0.676E-01	4.60	31.86	4.60	0.00	.88053E+03
213.20	6.80	4.60	1489.0	0.672E-01	4.60	32.08	4.60	0.00	.21283E+04
351.70	6.80	4.60	1498.8	0.667E-01	4.60	32.29	4.60	0.00	.33760E+04
490.21	6.80	4.60	1508.5	0.663E-01	4.60	32.50	4.60	0.00	.46237E+04
628.72	6.80	4.60	1518.2	0.659E-01	4.60	32.70	4.60	0.00	.58714E+04
767.22	6.80	4.60	1527.8	0.655E-01	4.60	32.91	4.60	0.00	.71192E+04
905.73	6.80	4.60	1537.3	0.650E-01	4.60	33.12	4.60	0.00	.83669E+04
1044.23	6.80	4.60	1546.8	0.646E-01	4.60	33.32	4.60	0.00	.96146E+04
1182.74	6.80	4.60	1556.2	0.643E-01	4.60	33.52	4.60	0.00	.10862E+05
1321.25	6.80	4.60	1565.6	0.639E-01	4.60	33.73	4.60	0.00	.12110E+05
1459.75	6.80	4.60	1574.9	0.635E-01	4.60	33.93	4.60	0.00	.13358E+05
1598.26	6.80	4.60	1584.2	0.631E-01	4.60	34.13	4.60	0.00	.14606E+05
1736.77	6.80	4.60	1593.4	0.628E-01	4.60	34.32	4.60	0.00	.15853E+05
1875.27	6.80	4.60	1602.5	0.624E-01	4.60	34.52	4.60	0.00	.17101E+05
2013.78	6.80	4.60	1611.6	0.621E-01	4.60	34.72	4.60	0.00	.18349E+05
2152.28	6.80	4.60	1620.6	0.617E-01	4.60	34.91	4.60	0.00	.19596E+05
2290.79	6.80	4.60	1629.6	0.614E-01	4.60	35.11	4.60	0.00	.20844E+05

2429.30	6.80	4.60	1638.6	0.610E-01	4.60	35.30	4.60	0.00	.22092E+05
2567.80	6.80	4.60	1647.5	0.607E-01	4.60	35.49	4.60	0.00	.23340E+05
2706.31	6.80	4.60	1656.3	0.604E-01	4.60	35.68	4.60	0.00	.24587E+05
2844.81	6.80	4.60	1665.1	0.601E-01	4.60	35.87	4.60	0.00	.25835E+05
2983.32	6.80	4.60	1673.9	0.597E-01	4.60	36.06	4.60	0.00	.27083E+05
3121.83	6.80	4.60	1682.6	0.594E-01	4.60	36.25	4.60	0.00	.28331E+05
3260.33	6.80	4.60	1691.3	0.591E-01	4.60	36.43	4.60	0.00	.29578E+05
3398.84	6.80	4.60	1699.9	0.588E-01	4.60	36.62	4.60	0.00	.30826E+05
3537.35	6.80	4.60	1708.5	0.585E-01	4.60	36.80	4.60	0.00	.32074E+05
3675.85	6.80	4.60	1717.0	0.582E-01	4.60	36.99	4.60	0.00	.33321E+05
3814.36	6.80	4.60	1725.5	0.580E-01	4.60	37.17	4.60	0.00	.34569E+05
3952.86	6.80	4.60	1734.0	0.577E-01	4.60	37.35	4.60	0.00	.35817E+05
4091.37	6.80	4.60	1742.4	0.574E-01	4.60	37.53	4.60	0.00	.37065E+05
4229.88	6.80	4.60	1750.7	0.571E-01	4.60	37.71	4.60	0.00	.38312E+05
4368.38	6.80	4.60	1759.1	0.568E-01	4.60	37.89	4.60	0.00	.39560E+05
4506.89	6.80	4.60	1767.4	0.566E-01	4.60	38.07	4.60	0.00	.40808E+05
4645.40	6.80	4.60	1775.6	0.563E-01	4.60	38.25	4.60	0.00	.42056E+05
4783.90	6.80	4.60	1783.8	0.561E-01	4.60	38.43	4.60	0.00	.43303E+05
4922.41	6.80	4.60	1792.0	0.558E-01	4.60	38.60	4.60	0.00	.44551E+05
5060.91	6.80	4.60	1800.1	0.556E-01	4.60	38.78	4.60	0.00	.45799E+05
5199.42	6.80	4.60	1808.2	0.553E-01	4.60	38.95	4.60	0.00	.47046E+05
5337.93	6.80	4.60	1816.3	0.551E-01	4.60	39.13	4.60	0.00	.48294E+05
5476.43	6.80	4.60	1824.3	0.548E-01	4.60	39.30	4.60	0.00	.49542E+05
5614.94	6.80	4.60	1832.3	0.546E-01	4.60	39.47	4.60	0.00	.50790E+05
5753.45	6.80	4.60	1840.3	0.543E-01	4.60	39.64	4.60	0.00	.52037E+05
5891.95	6.80	4.60	1848.2	0.541E-01	4.60	39.81	4.60	0.00	.53285E+05
6030.46	6.80	4.60	1856.1	0.539E-01	4.60	39.98	4.60	0.00	.54533E+05
6168.96	6.80	4.60	1864.0	0.536E-01	4.60	40.15	4.60	0.00	.55781E+05
6307.47	6.80	4.60	1871.8	0.534E-01	4.60	40.32	4.60	0.00	.57028E+05
6445.98	6.80	4.60	1879.6	0.532E-01	4.60	40.49	4.60	0.00	.58276E+05
6584.48	6.80	4.60	1887.4	0.530E-01	4.60	40.66	4.60	0.00	.59524E+05
6722.99	6.80	4.60	1895.1	0.528E-01	4.60	40.82	4.60	0.00	.60771E+05
6861.50	6.80	4.60	1902.8	0.526E-01	4.60	40.99	4.60	0.00	.62019E+05
7000.00	6.80	4.60	1910.5	0.523E-01	4.60	41.15	4.60	0.00	.63267E+05

```
 Cumulative travel time =       63266.8594 sec  (   17.57 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario2
 FILE NAME:         E:\Projets\Nemaska\Scenarios\2\S2_Q40lps.prd
 Time stamp:        Tue Dec 16 09:25:26 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3220.00  QA    =    357.42  ICHREG= 1
 HA    =      4.60  HD    =      4.60
 UA    =      0.111 F     =      0.005 USTAR =0.2696E-02
 UW    =      1.800 UWSTAR=0.1968E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.2460

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    182.30  YB1   =    125.00  YB2   =    239.60
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.35
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    130.20  THETA =      0.00  SIGMA =      5.20  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.2460  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.86  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      9.56  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      9.56
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.60  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       182.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.950   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.60m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.14    0.38   148.2 0.675E+00   0.30    74.97 .16315E+02
```

2.99	0.27	0.52	209.1	0.478E+00	0.60	74.94	.33387E+02
4.48	0.41	0.65	255.9	0.391E+00	0.90	74.91	.50603E+02
5.98	0.54	0.78	295.3	0.339E+00	1.20	74.88	.67893E+02
7.47	0.68	0.92	330.1	0.303E+00	1.50	74.85	.85231E+02
8.96	0.82	1.05	361.5	0.277E+00	1.80	74.83	.10260E+03
10.46	0.95	1.19	390.4	0.256E+00	2.10	74.81	.12000E+03
11.95	1.09	1.32	417.2	0.240E+00	2.40	74.78	.13742E+03
13.44	1.22	1.45	442.5	0.226E+00	2.70	74.76	.15485E+03
14.94	1.36	1.59	466.4	0.214E+00	3.00	74.74	.17230E+03
16.43	1.50	1.72	489.1	0.204E+00	3.30	74.72	.18976E+03
17.93	1.63	1.85	510.8	0.196E+00	3.60	74.71	.20723E+03
19.42	1.77	1.99	531.6	0.188E+00	3.90	74.69	.22471E+03
20.91	1.90	2.12	551.6	0.181E+00	4.20	74.67	.24220E+03
22.41	2.04	2.26	571.0	0.175E+00	4.50	74.66	.25970E+03
23.90	2.18	2.30	589.7	0.170E+00	4.60	74.64	.27720E+03
25.40	2.31	2.30	607.8	0.165E+00	4.60	74.63	.29471E+03
26.89	2.45	2.30	625.4	0.160E+00	4.60	74.62	.31222E+03
28.38	2.58	2.30	642.5	0.156E+00	4.60	74.60	.32974E+03
29.88	2.72	2.30	659.1	0.152E+00	4.60	74.59	.34726E+03
31.37	2.85	2.30	675.4	0.148E+00	4.60	74.58	.36478E+03
32.86	2.99	2.30	691.3	0.145E+00	4.60	74.57	.38231E+03
34.36	3.13	2.30	706.8	0.141E+00	4.60	74.56	.39985E+03
35.85	3.26	2.30	721.9	0.139E+00	4.60	74.55	.41739E+03
37.35	3.40	2.30	736.8	0.136E+00	4.60	74.54	.43493E+03
38.84	3.53	2.30	751.4	0.133E+00	4.60	74.53	.45247E+03
40.33	3.67	2.30	765.7	0.131E+00	4.60	74.52	.47002E+03
41.83	3.81	2.30	779.7	0.128E+00	4.60	74.51	.48757E+03
43.32	3.94	2.30	793.5	0.126E+00	4.60	74.50	.50512E+03
44.81	4.08	2.30	807.0	0.124E+00	4.60	74.50	.52267E+03
46.31	4.21	2.30	815.9	0.123E+00	4.60	74.49	.54018E+03
47.80	4.35	2.30	815.9	0.123E+00	4.60	74.48	.55761E+03
49.30	4.49	2.30	815.9	0.123E+00	4.60	74.48	.57503E+03
50.79	4.62	2.30	815.9	0.123E+00	4.60	74.47	.59246E+03
52.28	4.76	2.30	815.9	0.123E+00	4.60	74.47	.60989E+03
53.78	4.89	2.30	815.9	0.123E+00	4.60	74.46	.62731E+03
55.27	5.03	2.30	815.9	0.123E+00	4.60	74.46	.64474E+03
56.77	5.17	2.30	815.9	0.123E+00	4.60	74.45	.66216E+03
58.26	5.30	2.30	815.9	0.123E+00	4.60	74.45	.67959E+03
59.75	5.44	2.30	815.9	0.123E+00	4.60	74.45	.69701E+03
61.25	5.57	2.30	815.9	0.123E+00	4.60	74.45	.71444E+03
62.74	5.71	2.30	815.9	0.123E+00	4.60	74.44	.73186E+03
64.23	5.85	2.30	815.9	0.123E+00	4.60	74.44	.74929E+03
65.73	5.98	2.30	815.9	0.123E+00	4.60	74.44	.76671E+03
67.22	6.12	2.30	815.9	0.123E+00	4.60	74.44	.78414E+03
68.72	6.25	2.30	815.9	0.123E+00	4.60	74.44	.80156E+03
70.21	6.39	2.30	815.9	0.123E+00	4.60	74.44	.81899E+03
71.70	6.53	2.30	815.9	0.123E+00	4.60	74.44	.83641E+03
73.20	6.66	2.30	815.9	0.123E+00	4.60	74.44	.85384E+03
74.69	6.80	2.30	815.9	0.123E+00	4.60	74.43	.87127E+03

Cumulative travel time = 871.2651 sec (0.24 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.277E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.346E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.69	6.80	4.60	815.9	0.123E+00	4.60	31.96	4.60	0.00	.87127E+03
213.20	6.80	4.60	821.4	0.122E+00	4.60	32.17	4.60	0.00	.21189E+04
351.70	6.80	4.60	826.7	0.121E+00	4.60	32.38	4.60	0.00	.33666E+04
490.21	6.80	4.60	832.1	0.120E+00	4.60	32.59	4.60	0.00	.46143E+04
628.72	6.80	4.60	837.3	0.119E+00	4.60	32.79	4.60	0.00	.58619E+04
767.22	6.80	4.60	842.6	0.119E+00	4.60	33.00	4.60	0.00	.71096E+04
905.73	6.80	4.60	847.8	0.118E+00	4.60	33.21	4.60	0.00	.83572E+04
1044.23	6.80	4.60	853.0	0.117E+00	4.60	33.41	4.60	0.00	.96049E+04
1182.74	6.80	4.60	858.2	0.117E+00	4.60	33.61	4.60	0.00	.10853E+05
1321.25	6.80	4.60	863.4	0.116E+00	4.60	33.81	4.60	0.00	.12100E+05
1459.75	6.80	4.60	868.5	0.115E+00	4.60	34.01	4.60	0.00	.13348E+05
1598.26	6.80	4.60	873.5	0.114E+00	4.60	34.21	4.60	0.00	.14596E+05
1736.77	6.80	4.60	878.6	0.114E+00	4.60	34.41	4.60	0.00	.15843E+05
1875.27	6.80	4.60	883.6	0.113E+00	4.60	34.61	4.60	0.00	.17091E+05
2013.78	6.80	4.60	888.6	0.113E+00	4.60	34.80	4.60	0.00	.18339E+05
2152.28	6.80	4.60	893.6	0.112E+00	4.60	35.00	4.60	0.00	.19586E+05
2290.79	6.80	4.60	898.5	0.111E+00	4.60	35.19	4.60	0.00	.20834E+05

```
   2429.30      6.80     4.60    903.4 0.111E+00    4.60     35.38     4.60    0.00   .22082E+05
   2567.80      6.80     4.60    908.3 0.110E+00    4.60     35.57     4.60    0.00   .23329E+05
   2706.31      6.80     4.60    913.1 0.110E+00    4.60     35.76     4.60    0.00   .24577E+05
   2844.81      6.80     4.60    918.0 0.109E+00    4.60     35.95     4.60    0.00   .25825E+05
   2983.32      6.80     4.60    922.8 0.108E+00    4.60     36.14     4.60    0.00   .27072E+05
   3121.83      6.80     4.60    927.6 0.108E+00    4.60     36.33     4.60    0.00   .28320E+05
   3260.33      6.80     4.60    932.3 0.107E+00    4.60     36.51     4.60    0.00   .29568E+05
   3398.84      6.80     4.60    937.0 0.107E+00    4.60     36.70     4.60    0.00   .30815E+05
   3537.35      6.80     4.60    941.8 0.106E+00    4.60     36.88     4.60    0.00   .32063E+05
   3675.85      6.80     4.60    946.4 0.106E+00    4.60     37.07     4.60    0.00   .33311E+05
   3814.36      6.80     4.60    951.1 0.105E+00    4.60     37.25     4.60    0.00   .34558E+05
   3952.86      6.80     4.60    955.7 0.105E+00    4.60     37.43     4.60    0.00   .35806E+05
   4091.37      6.80     4.60    960.4 0.104E+00    4.60     37.61     4.60    0.00   .37054E+05
   4229.88      6.80     4.60    964.9 0.104E+00    4.60     37.79     4.60    0.00   .38301E+05
   4368.38      6.80     4.60    969.5 0.103E+00    4.60     37.97     4.60    0.00   .39549E+05
   4506.89      6.80     4.60    974.1 0.103E+00    4.60     38.15     4.60    0.00   .40797E+05
   4645.40      6.80     4.60    978.6 0.102E+00    4.60     38.33     4.60    0.00   .42044E+05
   4783.90      6.80     4.60    983.1 0.102E+00    4.60     38.50     4.60    0.00   .43292E+05
   4922.41      6.80     4.60    987.6 0.101E+00    4.60     38.68     4.60    0.00   .44540E+05
   5060.91      6.80     4.60    992.1 0.101E+00    4.60     38.85     4.60    0.00   .45787E+05
   5199.42      6.80     4.60    996.5 0.100E+00    4.60     39.03     4.60    0.00   .47035E+05
   5337.93      6.80     4.60   1000.9 0.999E-01    4.60     39.20     4.60    0.00   .48282E+05
   5476.43      6.80     4.60   1005.3 0.995E-01    4.60     39.37     4.60    0.00   .49530E+05
   5614.94      6.80     4.60   1009.7 0.990E-01    4.60     39.55     4.60    0.00   .50778E+05
   5753.45      6.80     4.60   1014.1 0.986E-01    4.60     39.72     4.60    0.00   .52025E+05
   5891.95      6.80     4.60   1018.5 0.982E-01    4.60     39.89     4.60    0.00   .53273E+05
   6030.46      6.80     4.60   1022.8 0.978E-01    4.60     40.06     4.60    0.00   .54521E+05
   6168.96      6.80     4.60   1027.1 0.974E-01    4.60     40.23     4.60    0.00   .55768E+05
   6307.47      6.80     4.60   1031.4 0.970E-01    4.60     40.40     4.60    0.00   .57016E+05
   6445.98      6.80     4.60   1035.7 0.966E-01    4.60     40.56     4.60    0.00   .58264E+05
   6584.48      6.80     4.60   1039.9 0.962E-01    4.60     40.73     4.60    0.00   .59511E+05
   6722.99      6.80     4.60   1044.2 0.958E-01    4.60     40.90     4.60    0.00   .60759E+05
   6861.50      6.80     4.60   1048.4 0.954E-01    4.60     41.06     4.60    0.00   .62007E+05
   7000.00      6.80     4.60   1052.6 0.950E-01    4.60     41.23     4.60    0.00   .63254E+05
 Cumulative travel time =       63254.4531 sec  (   17.57 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario2
 FILE NAME:         E:\Projets\Nemaska\Scenarios\2\S2_Q62lps.prd
 Time stamp:        Tue Dec 16 09:26:19 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3220.00  QA    =    357.42  ICHREG= 1
 HA    =      4.60  HD    =      4.60
 UA    =      0.111 F     =      0.005 USTAR =0.2696E-02
 UW    =      1.800 UWSTAR=0.1968E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.2460

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    182.30  YB1   =    125.00  YB2   =    239.60
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.35
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    130.20  THETA =      0.00  SIGMA =      5.20  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.2460  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.06
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.88  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.82  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.82
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.60  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       182.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.534   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.60m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.14    0.38    96.4 0.104E+01   0.30    74.92 .14730E+02
```

2.99	0.27	0.52	136.0	0.735E+00	0.60	74.85	.30967E+02
4.48	0.41	0.65	166.3	0.601E+00	0.90	74.78	.47533E+02
5.98	0.54	0.78	191.9	0.521E+00	1.20	74.72	.64273E+02
7.47	0.68	0.92	214.4	0.466E+00	1.50	74.66	.81123E+02
8.96	0.82	1.05	234.8	0.426E+00	1.80	74.60	.98054E+02
10.46	0.95	1.19	253.5	0.394E+00	2.10	74.54	.11504E+03
11.95	1.09	1.32	270.9	0.369E+00	2.40	74.49	.13208E+03
13.44	1.22	1.45	287.3	0.348E+00	2.70	74.44	.14916E+03
14.94	1.36	1.59	302.8	0.330E+00	3.00	74.40	.16627E+03
16.43	1.50	1.72	317.5	0.315E+00	3.30	74.35	.18341E+03
17.93	1.63	1.85	331.6	0.302E+00	3.60	74.31	.20058E+03
19.42	1.77	1.99	345.1	0.290E+00	3.90	74.27	.21776E+03
20.91	1.90	2.12	358.1	0.279E+00	4.20	74.24	.23497E+03
22.41	2.04	2.26	370.6	0.270E+00	4.50	74.20	.25219E+03
23.90	2.18	2.30	382.8	0.261E+00	4.60	74.17	.26943E+03
25.40	2.31	2.30	394.5	0.253E+00	4.60	74.13	.28668E+03
26.89	2.45	2.30	405.9	0.246E+00	4.60	74.10	.30394E+03
28.38	2.58	2.30	417.0	0.240E+00	4.60	74.07	.32122E+03
29.88	2.72	2.30	427.8	0.234E+00	4.60	74.04	.33850E+03
31.37	2.85	2.30	438.4	0.228E+00	4.60	74.02	.35580E+03
32.86	2.99	2.30	448.7	0.223E+00	4.60	73.99	.37310E+03
34.36	3.13	2.30	458.7	0.218E+00	4.60	73.97	.39042E+03
35.85	3.26	2.30	468.6	0.213E+00	4.60	73.94	.40774E+03
37.35	3.40	2.30	478.2	0.209E+00	4.60	73.92	.42507E+03
38.84	3.53	2.30	487.6	0.205E+00	4.60	73.90	.44241E+03
40.33	3.67	2.30	496.9	0.201E+00	4.60	73.88	.45975E+03
41.83	3.81	2.30	506.0	0.198E+00	4.60	73.86	.47710E+03
43.32	3.94	2.30	515.0	0.194E+00	4.60	73.84	.49446E+03
44.81	4.08	2.30	523.7	0.191E+00	4.60	73.82	.51182E+03
46.31	4.21	2.30	529.5	0.189E+00	4.60	73.81	.52909E+03
47.80	4.35	2.30	529.5	0.189E+00	4.60	73.79	.54615E+03
49.30	4.49	2.30	529.5	0.189E+00	4.60	73.78	.56322E+03
50.79	4.62	2.30	529.5	0.189E+00	4.60	73.77	.58029E+03
52.28	4.76	2.30	529.5	0.189E+00	4.60	73.75	.59736E+03
53.78	4.89	2.30	529.5	0.189E+00	4.60	73.74	.61442E+03
55.27	5.03	2.30	529.5	0.189E+00	4.60	73.73	.63149E+03
56.77	5.17	2.30	529.5	0.189E+00	4.60	73.72	.64856E+03
58.26	5.30	2.30	529.5	0.189E+00	4.60	73.72	.66563E+03
59.75	5.44	2.30	529.5	0.189E+00	4.60	73.71	.68269E+03
61.25	5.57	2.30	529.5	0.189E+00	4.60	73.70	.69976E+03
62.74	5.71	2.30	529.5	0.189E+00	4.60	73.70	.71683E+03
64.23	5.85	2.30	529.5	0.189E+00	4.60	73.69	.73390E+03
65.73	5.98	2.30	529.5	0.189E+00	4.60	73.69	.75096E+03
67.22	6.12	2.30	529.5	0.189E+00	4.60	73.69	.76803E+03
68.72	6.25	2.30	529.5	0.189E+00	4.60	73.68	.78510E+03
70.21	6.39	2.30	529.5	0.189E+00	4.60	73.68	.80216E+03
71.70	6.53	2.30	529.5	0.189E+00	4.60	73.68	.81923E+03
73.20	6.66	2.30	529.5	0.189E+00	4.60	73.68	.83630E+03
74.69	6.80	2.30	529.5	0.189E+00	4.60	73.68	.85337E+03

Cumulative travel time = 853.3666 sec (0.24 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
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** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.277E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.346E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.69	6.80	4.60	529.5	0.189E+00	4.60	32.14	4.60	0.00	.85337E+03
213.20	6.80	4.60	533.0	0.188E+00	4.60	32.35	4.60	0.00	.21010E+04
351.70	6.80	4.60	536.4	0.186E+00	4.60	32.56	4.60	0.00	.33485E+04
490.21	6.80	4.60	539.8	0.185E+00	4.60	32.77	4.60	0.00	.45961E+04
628.72	6.80	4.60	543.2	0.184E+00	4.60	32.98	4.60	0.00	.58437E+04
767.22	6.80	4.60	546.6	0.183E+00	4.60	33.18	4.60	0.00	.70913E+04
905.73	6.80	4.60	550.0	0.182E+00	4.60	33.39	4.60	0.00	.83389E+04
1044.23	6.80	4.60	553.3	0.181E+00	4.60	33.59	4.60	0.00	.95865E+04
1182.74	6.80	4.60	556.6	0.180E+00	4.60	33.79	4.60	0.00	.10834E+05
1321.25	6.80	4.60	559.9	0.179E+00	4.60	33.99	4.60	0.00	.12082E+05
1459.75	6.80	4.60	563.2	0.178E+00	4.60	34.19	4.60	0.00	.13329E+05
1598.26	6.80	4.60	566.5	0.177E+00	4.60	34.39	4.60	0.00	.14577E+05
1736.77	6.80	4.60	569.7	0.176E+00	4.60	34.58	4.60	0.00	.15824E+05
1875.27	6.80	4.60	572.9	0.175E+00	4.60	34.78	4.60	0.00	.17072E+05
2013.78	6.80	4.60	576.1	0.174E+00	4.60	34.97	4.60	0.00	.18320E+05
2152.28	6.80	4.60	579.3	0.173E+00	4.60	35.17	4.60	0.00	.19567E+05
2290.79	6.80	4.60	582.5	0.172E+00	4.60	35.36	4.60	0.00	.20815E+05

2429.30	6.80	4.60	585.6	0.171E+00	4.60	35.55	4.60	0.00	.22062E+05
2567.80	6.80	4.60	588.8	0.170E+00	4.60	35.74	4.60	0.00	.23310E+05
2706.31	6.80	4.60	591.9	0.169E+00	4.60	35.93	4.60	0.00	.24558E+05
2844.81	6.80	4.60	595.0	0.168E+00	4.60	36.12	4.60	0.00	.25805E+05
2983.32	6.80	4.60	598.1	0.167E+00	4.60	36.31	4.60	0.00	.27053E+05
3121.83	6.80	4.60	601.2	0.166E+00	4.60	36.49	4.60	0.00	.28300E+05
3260.33	6.80	4.60	604.2	0.166E+00	4.60	36.68	4.60	0.00	.29548E+05
3398.84	6.80	4.60	607.3	0.165E+00	4.60	36.86	4.60	0.00	.30795E+05
3537.35	6.80	4.60	610.3	0.164E+00	4.60	37.05	4.60	0.00	.32043E+05
3675.85	6.80	4.60	613.3	0.163E+00	4.60	37.23	4.60	0.00	.33291E+05
3814.36	6.80	4.60	616.3	0.162E+00	4.60	37.41	4.60	0.00	.34538E+05
3952.86	6.80	4.60	619.3	0.161E+00	4.60	37.59	4.60	0.00	.35786E+05
4091.37	6.80	4.60	622.2	0.161E+00	4.60	37.77	4.60	0.00	.37033E+05
4229.88	6.80	4.60	625.2	0.160E+00	4.60	37.95	4.60	0.00	.38281E+05
4368.38	6.80	4.60	628.1	0.159E+00	4.60	38.13	4.60	0.00	.39529E+05
4506.89	6.80	4.60	631.0	0.158E+00	4.60	38.31	4.60	0.00	.40776E+05
4645.40	6.80	4.60	633.9	0.158E+00	4.60	38.48	4.60	0.00	.42024E+05
4783.90	6.80	4.60	636.8	0.157E+00	4.60	38.66	4.60	0.00	.43271E+05
4922.41	6.80	4.60	639.7	0.156E+00	4.60	38.83	4.60	0.00	.44519E+05
5060.91	6.80	4.60	642.6	0.156E+00	4.60	39.01	4.60	0.00	.45766E+05
5199.42	6.80	4.60	645.5	0.155E+00	4.60	39.18	4.60	0.00	.47014E+05
5337.93	6.80	4.60	648.3	0.154E+00	4.60	39.35	4.60	0.00	.48262E+05
5476.43	6.80	4.60	651.1	0.154E+00	4.60	39.53	4.60	0.00	.49509E+05
5614.94	6.80	4.60	654.0	0.153E+00	4.60	39.70	4.60	0.00	.50757E+05
5753.45	6.80	4.60	656.8	0.152E+00	4.60	39.87	4.60	0.00	.52004E+05
5891.95	6.80	4.60	659.6	0.152E+00	4.60	40.04	4.60	0.00	.53252E+05
6030.46	6.80	4.60	662.4	0.151E+00	4.60	40.21	4.60	0.00	.54500E+05
6168.96	6.80	4.60	665.1	0.150E+00	4.60	40.37	4.60	0.00	.55747E+05
6307.47	6.80	4.60	667.9	0.150E+00	4.60	40.54	4.60	0.00	.56995E+05
6445.98	6.80	4.60	670.6	0.149E+00	4.60	40.71	4.60	0.00	.58242E+05
6584.48	6.80	4.60	673.4	0.149E+00	4.60	40.88	4.60	0.00	.59490E+05
6722.99	6.80	4.60	676.1	0.148E+00	4.60	41.04	4.60	0.00	.60738E+05
6861.50	6.80	4.60	678.8	0.147E+00	4.60	41.21	4.60	0.00	.61985E+05
7000.00	6.80	4.60	681.5	0.147E+00	4.60	41.37	4.60	0.00	.63233E+05

Cumulative travel time = 63232.7148 sec (17.56 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario3
 FILE NAME:         E:\Projets\Nemaska\Scenarios\3\S3_Q22lps.prd
 Time stamp:        Tue Dec 16 09:27:11 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3129.00  QA    =    306.64  ICHREG= 1
 HA    =      4.47  HD    =      4.47
 UA    =      0.098 F     =      0.005 USTAR =0.2392E-02
 UW    =      3.200 UWSTAR=0.3620E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.9443

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    180.75  YB1   =    125.00  YB2   =    236.50
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.22
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    132.00  THETA =      0.00  SIGMA =      7.00  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  998.9443  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.01
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.16  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.95  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.95
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.47  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       180.75 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.486   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.47m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.18    0.38   227.1 0.440E+00   0.30    74.99 .19895E+02
```

2.98	0.37	0.52	320.8	0.312E+00	0.60	74.97	.40189E+02
4.47	0.55	0.65	392.6	0.255E+00	0.90	74.96	.60553E+02
5.96	0.73	0.78	453.2	0.221E+00	1.20	74.95	.80954E+02
7.44	0.91	0.92	506.6	0.197E+00	1.50	74.94	.10138E+03
8.93	1.10	1.05	554.9	0.180E+00	1.80	74.93	.12182E+03
10.42	1.28	1.18	599.2	0.167E+00	2.10	74.92	.14227E+03
11.91	1.46	1.32	640.5	0.156E+00	2.40	74.91	.16274E+03
13.40	1.65	1.45	679.3	0.147E+00	2.70	74.90	.18321E+03
14.89	1.83	1.58	716.0	0.140E+00	3.00	74.89	.20368E+03
16.38	2.01	1.72	750.9	0.133E+00	3.30	74.88	.22417E+03
17.87	2.19	1.85	784.3	0.128E+00	3.60	74.87	.24466E+03
19.35	2.38	1.98	816.3	0.123E+00	3.90	74.87	.26515E+03
20.84	2.56	2.12	847.0	0.118E+00	4.20	74.86	.28565E+03
22.33	2.74	2.23	876.7	0.114E+00	4.47	74.85	.30615E+03
23.82	2.92	2.23	905.5	0.110E+00	4.47	74.85	.32665E+03
25.31	3.11	2.23	933.3	0.107E+00	4.47	74.84	.34716E+03
26.80	3.29	2.23	960.3	0.104E+00	4.47	74.84	.36767E+03
28.29	3.47	2.23	986.6	0.101E+00	4.47	74.83	.38818E+03
29.78	3.66	2.23	1012.2	0.988E-01	4.47	74.83	.40869E+03
31.27	3.84	2.23	1037.2	0.964E-01	4.47	74.82	.42921E+03
32.75	4.02	2.23	1061.6	0.942E-01	4.47	74.82	.44973E+03
34.24	4.20	2.23	1085.4	0.921E-01	4.47	74.81	.47025E+03
35.73	4.39	2.23	1108.7	0.902E-01	4.47	74.81	.49077E+03
37.22	4.57	2.23	1131.6	0.884E-01	4.47	74.80	.51129E+03
38.71	4.75	2.23	1154.0	0.867E-01	4.47	74.80	.53181E+03
40.20	4.94	2.23	1175.9	0.850E-01	4.47	74.80	.55234E+03
41.69	5.12	2.23	1197.5	0.835E-01	4.47	74.79	.57287E+03
43.18	5.30	2.23	1218.7	0.821E-01	4.47	74.79	.59339E+03
44.66	5.48	2.23	1235.3	0.809E-01	4.47	74.79	.61391E+03
46.15	5.67	2.23	1235.3	0.809E-01	4.47	74.78	.63437E+03
47.64	5.85	2.23	1235.3	0.809E-01	4.47	74.78	.65484E+03
49.13	6.03	2.23	1235.3	0.809E-01	4.47	74.78	.67530E+03
50.62	6.22	2.23	1235.3	0.809E-01	4.47	74.77	.69577E+03
52.11	6.40	2.23	1235.3	0.809E-01	4.47	74.77	.71623E+03
53.60	6.58	2.23	1235.3	0.809E-01	4.47	74.77	.73669E+03
55.09	6.76	2.23	1235.3	0.809E-01	4.47	74.77	.75716E+03
56.58	6.95	2.23	1235.3	0.809E-01	4.47	74.77	.77762E+03
58.06	7.13	2.23	1235.3	0.809E-01	4.47	74.77	.79808E+03
59.55	7.31	2.23	1235.3	0.809E-01	4.47	74.76	.81855E+03
61.04	7.49	2.23	1235.3	0.809E-01	4.47	74.76	.83901E+03
62.53	7.68	2.23	1235.3	0.809E-01	4.47	74.76	.85947E+03
64.02	7.86	2.23	1235.3	0.809E-01	4.47	74.76	.87994E+03
65.51	8.04	2.23	1235.3	0.809E-01	4.47	74.76	.90040E+03
67.00	8.23	2.23	1235.3	0.809E-01	4.47	74.76	.92087E+03
68.49	8.41	2.23	1235.3	0.809E-01	4.47	74.76	.94133E+03
69.97	8.59	2.23	1235.3	0.809E-01	4.47	74.76	.96179E+03
71.46	8.77	2.23	1235.3	0.809E-01	4.47	74.76	.98226E+03
72.95	8.96	2.23	1235.3	0.809E-01	4.47	74.76	.10027E+04
74.44	9.14	2.23	1235.3	0.809E-01	4.47	74.76	.10232E+04

Cumulative travel time = 1023.1842 sec (0.28 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.64 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.352E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.440E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.44	9.14	4.47	1235.3	0.809E-01	4.47	31.02	4.47	0.00	.10232E+04
212.95	9.14	4.47	1247.8	0.801E-01	4.47	31.33	4.47	0.00	.24365E+04
351.46	9.14	4.47	1260.2	0.794E-01	4.47	31.64	4.47	0.00	.38497E+04
489.97	9.14	4.47	1272.4	0.786E-01	4.47	31.95	4.47	0.00	.52630E+04
628.49	9.14	4.47	1284.6	0.778E-01	4.47	32.25	4.47	0.00	.66763E+04
767.00	9.14	4.47	1296.6	0.771E-01	4.47	32.56	4.47	0.00	.80896E+04
905.51	9.14	4.47	1308.5	0.764E-01	4.47	32.85	4.47	0.00	.95029E+04
1044.02	9.14	4.47	1320.3	0.757E-01	4.47	33.15	4.47	0.00	.10916E+05
1182.53	9.14	4.47	1332.0	0.751E-01	4.47	33.44	4.47	0.00	.12329E+05
1321.04	9.14	4.47	1343.6	0.744E-01	4.47	33.74	4.47	0.00	.13743E+05
1459.55	9.14	4.47	1355.1	0.738E-01	4.47	34.02	4.47	0.00	.15156E+05
1598.06	9.14	4.47	1366.5	0.732E-01	4.47	34.31	4.47	0.00	.16569E+05
1736.58	9.14	4.47	1377.8	0.726E-01	4.47	34.59	4.47	0.00	.17983E+05
1875.09	9.14	4.47	1389.0	0.720E-01	4.47	34.88	4.47	0.00	.19396E+05
2013.60	9.14	4.47	1400.1	0.714E-01	4.47	35.15	4.47	0.00	.20809E+05
2152.11	9.14	4.47	1411.1	0.709E-01	4.47	35.43	4.47	0.00	.22222E+05
2290.62	9.14	4.47	1422.1	0.703E-01	4.47	35.71	4.47	0.00	.23636E+05

2429.13	9.14	4.47	1432.9	0.698E-01	4.47	35.98	4.47	0.00	.25049E+05
2567.64	9.14	4.47	1443.7	0.693E-01	4.47	36.25	4.47	0.00	.26462E+05
2706.15	9.14	4.47	1454.4	0.688E-01	4.47	36.52	4.47	0.00	.27875E+05
2844.67	9.14	4.47	1465.0	0.683E-01	4.47	36.79	4.47	0.00	.29289E+05
2983.18	9.14	4.47	1475.6	0.678E-01	4.47	37.05	4.47	0.00	.30702E+05
3121.69	9.14	4.47	1486.1	0.673E-01	4.47	37.31	4.47	0.00	.32115E+05
3260.20	9.14	4.47	1496.5	0.668E-01	4.47	37.57	4.47	0.00	.33529E+05
3398.71	9.14	4.47	1506.8	0.664E-01	4.47	37.83	4.47	0.00	.34942E+05
3537.22	9.14	4.47	1517.0	0.659E-01	4.47	38.09	4.47	0.00	.36355E+05
3675.73	9.14	4.47	1527.2	0.655E-01	4.47	38.35	4.47	0.00	.37768E+05
3814.24	9.14	4.47	1537.4	0.650E-01	4.47	38.60	4.47	0.00	.39182E+05
3952.75	9.14	4.47	1547.4	0.646E-01	4.47	38.85	4.47	0.00	.40595E+05
4091.27	9.14	4.47	1557.4	0.642E-01	4.47	39.10	4.47	0.00	.42008E+05
4229.78	9.14	4.47	1567.3	0.638E-01	4.47	39.35	4.47	0.00	.43422E+05
4368.29	9.14	4.47	1577.2	0.634E-01	4.47	39.60	4.47	0.00	.44835E+05
4506.80	9.14	4.47	1587.0	0.630E-01	4.47	39.85	4.47	0.00	.46248E+05
4645.31	9.14	4.47	1596.7	0.626E-01	4.47	40.09	4.47	0.00	.47661E+05
4783.82	9.14	4.47	1606.4	0.623E-01	4.47	40.34	4.47	0.00	.49075E+05
4922.33	9.14	4.47	1616.0	0.619E-01	4.47	40.58	4.47	0.00	.50488E+05
5060.84	9.14	4.47	1625.6	0.615E-01	4.47	40.82	4.47	0.00	.51901E+05
5199.36	9.14	4.47	1635.1	0.612E-01	4.47	41.06	4.47	0.00	.53314E+05
5337.87	9.14	4.47	1644.6	0.608E-01	4.47	41.29	4.47	0.00	.54728E+05
5476.38	9.14	4.47	1654.0	0.605E-01	4.47	41.53	4.47	0.00	.56141E+05
5614.89	9.14	4.47	1663.3	0.601E-01	4.47	41.76	4.47	0.00	.57554E+05
5753.40	9.14	4.47	1672.6	0.598E-01	4.47	42.00	4.47	0.00	.58968E+05
5891.91	9.14	4.47	1681.9	0.595E-01	4.47	42.23	4.47	0.00	.60381E+05
6030.42	9.14	4.47	1691.1	0.591E-01	4.47	42.46	4.47	0.00	.61794E+05
6168.93	9.14	4.47	1700.2	0.588E-01	4.47	42.69	4.47	0.00	.63207E+05
6307.45	9.14	4.47	1709.3	0.585E-01	4.47	42.92	4.47	0.00	.64621E+05
6445.96	9.14	4.47	1718.4	0.582E-01	4.47	43.15	4.47	0.00	.66034E+05
6584.47	9.14	4.47	1727.4	0.579E-01	4.47	43.37	4.47	0.00	.67447E+05
6722.98	9.14	4.47	1736.3	0.576E-01	4.47	43.60	4.47	0.00	.68861E+05
6861.49	9.14	4.47	1745.2	0.573E-01	4.47	43.82	4.47	0.00	.70274E+05
7000.00	9.14	4.47	1754.1	0.570E-01	4.47	44.04	4.47	0.00	.71687E+05

Cumulative travel time = 71687.0859 sec (19.91 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario3
 FILE NAME:         E:\Projets\Nemaska\Scenarios\3\S3_Q40lps.prd
 Time stamp:        Tue Dec 16 09:28:08 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3129.00  QA    =    306.64  ICHREG= 1
 HA    =      4.47  HD    =      4.47
 UA    =      0.098 F     =      0.005 USTAR =0.2392E-02
 UW    =      3.200 UWSTAR=0.3620E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.9443

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    180.75  YB1   =    125.00  YB2   =    236.50
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.22
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    132.00  THETA =      0.00  SIGMA =      7.00  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  998.9443  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.03
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.10  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     10.83  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     10.83
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.47  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       180.75 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.964   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.47m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.18    0.38   125.8 0.795E+00   0.30    74.95 .18459E+02
```

2.98	0.37	0.52	177.5	0.563E+00	0.60	74.91	.38068E+02
4.47	0.55	0.65	217.1	0.461E+00	0.90	74.87	.57904E+02
5.96	0.73	0.78	250.6	0.399E+00	1.20	74.83	.77859E+02
7.44	0.91	0.92	280.0	0.357E+00	1.50	74.80	.97890E+02
8.93	1.10	1.05	306.7	0.326E+00	1.80	74.76	.11797E+03
10.42	1.28	1.18	331.2	0.302E+00	2.10	74.73	.13810E+03
11.91	1.46	1.32	354.0	0.283E+00	2.40	74.70	.15826E+03
13.40	1.65	1.45	375.4	0.266E+00	2.70	74.67	.17844E+03
14.89	1.83	1.58	395.6	0.253E+00	3.00	74.64	.19865E+03
16.38	2.01	1.72	414.9	0.241E+00	3.30	74.62	.21887E+03
17.87	2.19	1.85	433.3	0.231E+00	3.60	74.59	.23912E+03
19.35	2.38	1.98	450.9	0.222E+00	3.90	74.57	.25937E+03
20.84	2.56	2.12	467.9	0.214E+00	4.20	74.55	.27964E+03
22.33	2.74	2.23	484.3	0.206E+00	4.47	74.53	.29992E+03
23.82	2.92	2.23	500.2	0.200E+00	4.47	74.51	.32022E+03
25.31	3.11	2.23	515.5	0.194E+00	4.47	74.49	.34052E+03
26.80	3.29	2.23	530.5	0.189E+00	4.47	74.47	.36083E+03
28.29	3.47	2.23	545.0	0.184E+00	4.47	74.45	.38114E+03
29.78	3.66	2.23	559.1	0.179E+00	4.47	74.43	.40147E+03
31.27	3.84	2.23	572.9	0.175E+00	4.47	74.42	.42180E+03
32.75	4.02	2.23	586.3	0.171E+00	4.47	74.40	.44214E+03
34.24	4.20	2.23	599.5	0.167E+00	4.47	74.39	.46248E+03
35.73	4.39	2.23	612.4	0.163E+00	4.47	74.37	.48283E+03
37.22	4.57	2.23	625.0	0.160E+00	4.47	74.36	.50318E+03
38.71	4.75	2.23	637.3	0.157E+00	4.47	74.35	.52354E+03
40.20	4.94	2.23	649.4	0.154E+00	4.47	74.34	.54390E+03
41.69	5.12	2.23	661.3	0.151E+00	4.47	74.32	.56427E+03
43.18	5.30	2.23	673.0	0.149E+00	4.47	74.31	.58464E+03
44.66	5.48	2.23	682.2	0.147E+00	4.47	74.30	.60497E+03
46.15	5.67	2.23	682.2	0.147E+00	4.47	74.29	.62514E+03
47.64	5.85	2.23	682.2	0.147E+00	4.47	74.29	.64531E+03
49.13	6.03	2.23	682.2	0.147E+00	4.47	74.28	.66547E+03
50.62	6.22	2.23	682.2	0.147E+00	4.47	74.27	.68564E+03
52.11	6.40	2.23	682.2	0.147E+00	4.47	74.26	.70580E+03
53.60	6.58	2.23	682.2	0.147E+00	4.47	74.26	.72597E+03
55.09	6.76	2.23	682.2	0.147E+00	4.47	74.25	.74613E+03
56.58	6.95	2.23	682.2	0.147E+00	4.47	74.25	.76630E+03
58.06	7.13	2.23	682.2	0.147E+00	4.47	74.24	.78647E+03
59.55	7.31	2.23	682.2	0.147E+00	4.47	74.24	.80663E+03
61.04	7.49	2.23	682.2	0.147E+00	4.47	74.23	.82680E+03
62.53	7.68	2.23	682.2	0.147E+00	4.47	74.23	.84696E+03
64.02	7.86	2.23	682.2	0.147E+00	4.47	74.23	.86713E+03
65.51	8.04	2.23	682.2	0.147E+00	4.47	74.23	.88729E+03
67.00	8.23	2.23	682.2	0.147E+00	4.47	74.22	.90746E+03
68.49	8.41	2.23	682.2	0.147E+00	4.47	74.22	.92763E+03
69.97	8.59	2.23	682.2	0.147E+00	4.47	74.22	.94779E+03
71.46	8.77	2.23	682.2	0.147E+00	4.47	74.22	.96796E+03
72.95	8.96	2.23	682.2	0.147E+00	4.47	74.22	.98812E+03
74.44	9.14	2.23	682.2	0.147E+00	4.47	74.22	.10083E+04

Cumulative travel time = 1008.2893 sec (0.28 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
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** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.352E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.440E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.44	9.14	4.47	682.2	0.147E+00	4.47	31.14	4.47	0.00	.10083E+04
212.95	9.14	4.47	689.1	0.145E+00	4.47	31.46	4.47	0.00	.24215E+04
351.46	9.14	4.47	695.9	0.144E+00	4.47	31.77	4.47	0.00	.38347E+04
489.97	9.14	4.47	702.6	0.142E+00	4.47	32.07	4.47	0.00	.52479E+04
628.49	9.14	4.47	709.2	0.141E+00	4.47	32.38	4.47	0.00	.66611E+04
767.00	9.14	4.47	715.8	0.140E+00	4.47	32.68	4.47	0.00	.80743E+04
905.51	9.14	4.47	722.3	0.138E+00	4.47	32.97	4.47	0.00	.94875E+04
1044.02	9.14	4.47	728.8	0.137E+00	4.47	33.27	4.47	0.00	.10901E+05
1182.53	9.14	4.47	735.2	0.136E+00	4.47	33.56	4.47	0.00	.12314E+05
1321.04	9.14	4.47	741.5	0.135E+00	4.47	33.85	4.47	0.00	.13727E+05
1459.55	9.14	4.47	747.8	0.134E+00	4.47	34.14	4.47	0.00	.15140E+05
1598.06	9.14	4.47	754.1	0.133E+00	4.47	34.42	4.47	0.00	.16553E+05
1736.58	9.14	4.47	760.3	0.132E+00	4.47	34.71	4.47	0.00	.17967E+05
1875.09	9.14	4.47	766.4	0.130E+00	4.47	34.99	4.47	0.00	.19380E+05
2013.60	9.14	4.47	772.5	0.129E+00	4.47	35.27	4.47	0.00	.20793E+05
2152.11	9.14	4.47	778.6	0.128E+00	4.47	35.54	4.47	0.00	.22206E+05
2290.62	9.14	4.47	784.6	0.127E+00	4.47	35.82	4.47	0.00	.23619E+05

2429.13	9.14	4.47	790.5	0.126E+00	4.47	36.09	4.47	0.00	.25033E+05
2567.64	9.14	4.47	796.4	0.126E+00	4.47	36.36	4.47	0.00	.26446E+05
2706.15	9.14	4.47	802.3	0.125E+00	4.47	36.63	4.47	0.00	.27859E+05
2844.67	9.14	4.47	808.1	0.124E+00	4.47	36.89	4.47	0.00	.29272E+05
2983.18	9.14	4.47	813.9	0.123E+00	4.47	37.16	4.47	0.00	.30685E+05
3121.69	9.14	4.47	819.7	0.122E+00	4.47	37.42	4.47	0.00	.32099E+05
3260.20	9.14	4.47	825.4	0.121E+00	4.47	37.68	4.47	0.00	.33512E+05
3398.71	9.14	4.47	831.0	0.120E+00	4.47	37.94	4.47	0.00	.34925E+05
3537.22	9.14	4.47	836.7	0.120E+00	4.47	38.19	4.47	0.00	.36338E+05
3675.73	9.14	4.47	842.3	0.119E+00	4.47	38.45	4.47	0.00	.37751E+05
3814.24	9.14	4.47	847.8	0.118E+00	4.47	38.70	4.47	0.00	.39165E+05
3952.75	9.14	4.47	853.3	0.117E+00	4.47	38.95	4.47	0.00	.40578E+05
4091.27	9.14	4.47	858.8	0.116E+00	4.47	39.20	4.47	0.00	.41991E+05
4229.78	9.14	4.47	864.2	0.116E+00	4.47	39.45	4.47	0.00	.43404E+05
4368.29	9.14	4.47	869.7	0.115E+00	4.47	39.70	4.47	0.00	.44817E+05
4506.80	9.14	4.47	875.0	0.114E+00	4.47	39.95	4.47	0.00	.46231E+05
4645.31	9.14	4.47	880.4	0.114E+00	4.47	40.19	4.47	0.00	.47644E+05
4783.82	9.14	4.47	885.7	0.113E+00	4.47	40.43	4.47	0.00	.49057E+05
4922.33	9.14	4.47	891.0	0.112E+00	4.47	40.67	4.47	0.00	.50470E+05
5060.84	9.14	4.47	896.2	0.112E+00	4.47	40.91	4.47	0.00	.51883E+05
5199.36	9.14	4.47	901.4	0.111E+00	4.47	41.15	4.47	0.00	.53297E+05
5337.87	9.14	4.47	906.6	0.110E+00	4.47	41.39	4.47	0.00	.54710E+05
5476.38	9.14	4.47	911.8	0.110E+00	4.47	41.62	4.47	0.00	.56123E+05
5614.89	9.14	4.47	916.9	0.109E+00	4.47	41.86	4.47	0.00	.57536E+05
5753.40	9.14	4.47	922.0	0.108E+00	4.47	42.09	4.47	0.00	.58949E+05
5891.91	9.14	4.47	927.1	0.108E+00	4.47	42.32	4.47	0.00	.60362E+05
6030.42	9.14	4.47	932.1	0.107E+00	4.47	42.55	4.47	0.00	.61776E+05
6168.93	9.14	4.47	937.2	0.107E+00	4.47	42.78	4.47	0.00	.63189E+05
6307.45	9.14	4.47	942.2	0.106E+00	4.47	43.01	4.47	0.00	.64602E+05
6445.96	9.14	4.47	947.1	0.106E+00	4.47	43.24	4.47	0.00	.66015E+05
6584.47	9.14	4.47	952.1	0.105E+00	4.47	43.46	4.47	0.00	.67428E+05
6722.98	9.14	4.47	957.0	0.104E+00	4.47	43.69	4.47	0.00	.68842E+05
6861.49	9.14	4.47	961.9	0.104E+00	4.47	43.91	4.47	0.00	.70255E+05
7000.00	9.14	4.47	966.7	0.103E+00	4.47	44.13	4.47	0.00	.71668E+05

```
 Cumulative travel time =       71668.0391 sec  (   19.91 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario3
 FILE NAME:         E:\Projets\Nemaska\Scenarios\3\S3_Q62lps.prd
 Time stamp:        Tue Dec 16 09:28:56 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3129.00  QA    =    306.64  ICHREG= 1
 HA    =      4.47  HD    =      4.47
 UA    =      0.098 F     =      0.005 USTAR =0.2392E-02
 UW    =      3.200 UWSTAR=0.3620E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.9443

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    180.75  YB1   =    125.00  YB2   =    236.50
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.22
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    132.00  THETA =      0.00  SIGMA =      7.00  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  998.9443  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.07
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      3.26  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     16.78  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     16.78
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.47  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       180.75 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.547   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.47m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.18    0.38    82.1 0.122E+01   0.30    74.89 .16154E+02
```

2.98	0.37	0.52	115.7	0.864E+00	0.60	74.79	.34466E+02
4.47	0.55	0.65	141.5	0.707E+00	0.90	74.70	.53284E+02
5.96	0.73	0.78	163.2	0.613E+00	1.20	74.61	.72372E+02
7.44	0.91	0.92	182.4	0.548E+00	1.50	74.53	.91634E+02
8.93	1.10	1.05	199.7	0.501E+00	1.80	74.45	.11102E+03
10.42	1.28	1.18	215.6	0.464E+00	2.10	74.38	.13050E+03
11.91	1.46	1.32	230.4	0.434E+00	2.40	74.31	.15006E+03
13.40	1.65	1.45	244.3	0.409E+00	2.70	74.24	.16968E+03
14.89	1.83	1.58	257.5	0.388E+00	3.00	74.18	.18936E+03
16.38	2.01	1.72	270.0	0.370E+00	3.30	74.12	.20907E+03
17.87	2.19	1.85	282.0	0.355E+00	3.60	74.06	.22883E+03
19.35	2.38	1.98	293.4	0.341E+00	3.90	74.01	.24862E+03
20.84	2.56	2.12	304.5	0.328E+00	4.20	73.95	.26844E+03
22.33	2.74	2.23	315.1	0.317E+00	4.47	73.90	.28829E+03
23.82	2.92	2.23	325.4	0.307E+00	4.47	73.86	.30816E+03
25.31	3.11	2.23	335.4	0.298E+00	4.47	73.81	.32805E+03
26.80	3.29	2.23	345.1	0.290E+00	4.47	73.77	.34797E+03
28.29	3.47	2.23	354.5	0.282E+00	4.47	73.73	.36790E+03
29.78	3.66	2.23	363.7	0.275E+00	4.47	73.69	.38785E+03
31.27	3.84	2.23	372.7	0.268E+00	4.47	73.65	.40781E+03
32.75	4.02	2.23	381.4	0.262E+00	4.47	73.62	.42779E+03
34.24	4.20	2.23	390.0	0.256E+00	4.47	73.58	.44779E+03
35.73	4.39	2.23	398.3	0.251E+00	4.47	73.55	.46779E+03
37.22	4.57	2.23	406.5	0.246E+00	4.47	73.52	.48781E+03
38.71	4.75	2.23	414.6	0.241E+00	4.47	73.49	.50784E+03
40.20	4.94	2.23	422.4	0.237E+00	4.47	73.46	.52788E+03
41.69	5.12	2.23	430.2	0.232E+00	4.47	73.44	.54794E+03
43.18	5.30	2.23	437.8	0.228E+00	4.47	73.41	.56800E+03
44.66	5.48	2.23	443.7	0.225E+00	4.47	73.39	.58797E+03
46.15	5.67	2.23	443.7	0.225E+00	4.47	73.37	.60757E+03
47.64	5.85	2.23	443.7	0.225E+00	4.47	73.34	.62717E+03
49.13	6.03	2.23	443.7	0.225E+00	4.47	73.33	.64677E+03
50.62	6.22	2.23	443.7	0.225E+00	4.47	73.31	.66637E+03
52.11	6.40	2.23	443.7	0.225E+00	4.47	73.29	.68597E+03
53.60	6.58	2.23	443.7	0.225E+00	4.47	73.28	.70557E+03
55.09	6.76	2.23	443.7	0.225E+00	4.47	73.26	.72516E+03
56.58	6.95	2.23	443.7	0.225E+00	4.47	73.25	.74476E+03
58.06	7.13	2.23	443.7	0.225E+00	4.47	73.24	.76436E+03
59.55	7.31	2.23	443.7	0.225E+00	4.47	73.23	.78396E+03
61.04	7.49	2.23	443.7	0.225E+00	4.47	73.22	.80356E+03
62.53	7.68	2.23	443.7	0.225E+00	4.47	73.22	.82316E+03
64.02	7.86	2.23	443.7	0.225E+00	4.47	73.21	.84276E+03
65.51	8.04	2.23	443.7	0.225E+00	4.47	73.21	.86236E+03
67.00	8.23	2.23	443.7	0.225E+00	4.47	73.20	.88196E+03
68.49	8.41	2.23	443.7	0.225E+00	4.47	73.20	.90156E+03
69.97	8.59	2.23	443.7	0.225E+00	4.47	73.19	.92115E+03
71.46	8.77	2.23	443.7	0.225E+00	4.47	73.19	.94075E+03
72.95	8.96	2.23	443.7	0.225E+00	4.47	73.19	.96035E+03
74.44	9.14	2.23	443.7	0.225E+00	4.47	73.19	.97995E+03

Cumulative travel time = 979.9515 sec (0.27 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.352E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.440E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.44	9.14	4.47	443.7	0.225E+00	4.47	31.40	4.47	0.00	.97995E+03
212.95	9.14	4.47	448.1	0.223E+00	4.47	31.71	4.47	0.00	.23930E+04
351.46	9.14	4.47	452.5	0.221E+00	4.47	32.01	4.47	0.00	.38061E+04
489.97	9.14	4.47	456.8	0.219E+00	4.47	32.32	4.47	0.00	.52192E+04
628.49	9.14	4.47	461.0	0.217E+00	4.47	32.62	4.47	0.00	.66323E+04
767.00	9.14	4.47	465.2	0.215E+00	4.47	32.92	4.47	0.00	.80454E+04
905.51	9.14	4.47	469.4	0.213E+00	4.47	33.21	4.47	0.00	.94585E+04
1044.02	9.14	4.47	473.5	0.211E+00	4.47	33.50	4.47	0.00	.10872E+05
1182.53	9.14	4.47	477.7	0.209E+00	4.47	33.79	4.47	0.00	.12285E+05
1321.04	9.14	4.47	481.7	0.208E+00	4.47	34.08	4.47	0.00	.13698E+05
1459.55	9.14	4.47	485.8	0.206E+00	4.47	34.37	4.47	0.00	.15111E+05
1598.06	9.14	4.47	489.8	0.204E+00	4.47	34.65	4.47	0.00	.16524E+05
1736.58	9.14	4.47	493.7	0.203E+00	4.47	34.93	4.47	0.00	.17937E+05
1875.09	9.14	4.47	497.7	0.201E+00	4.47	35.21	4.47	0.00	.19350E+05
2013.60	9.14	4.47	501.6	0.199E+00	4.47	35.49	4.47	0.00	.20763E+05
2152.11	9.14	4.47	505.5	0.198E+00	4.47	35.76	4.47	0.00	.22176E+05
2290.62	9.14	4.47	509.3	0.196E+00	4.47	36.03	4.47	0.00	.23589E+05

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   2429.13     9.14    4.47   513.1 0.195E+00   4.47    36.31    4.47    0.00   .25003E+05
   2567.64     9.14    4.47   516.9 0.193E+00   4.47    36.57    4.47    0.00   .26416E+05
   2706.15     9.14    4.47   520.7 0.192E+00   4.47    36.84    4.47    0.00   .27829E+05
   2844.67     9.14    4.47   524.4 0.191E+00   4.47    37.10    4.47    0.00   .29242E+05
   2983.18     9.14    4.47   528.1 0.189E+00   4.47    37.37    4.47    0.00   .30655E+05
   3121.69     9.14    4.47   531.8 0.188E+00   4.47    37.63    4.47    0.00   .32068E+05
   3260.20     9.14    4.47   535.5 0.187E+00   4.47    37.89    4.47    0.00   .33481E+05
   3398.71     9.14    4.47   539.1 0.185E+00   4.47    38.14    4.47    0.00   .34894E+05
   3537.22     9.14    4.47   542.7 0.184E+00   4.47    38.40    4.47    0.00   .36307E+05
   3675.73     9.14    4.47   546.3 0.183E+00   4.47    38.65    4.47    0.00   .37720E+05
   3814.24     9.14    4.47   549.9 0.182E+00   4.47    38.90    4.47    0.00   .39133E+05
   3952.75     9.14    4.47   553.4 0.181E+00   4.47    39.16    4.47    0.00   .40547E+05
   4091.27     9.14    4.47   556.9 0.180E+00   4.47    39.40    4.47    0.00   .41960E+05
   4229.78     9.14    4.47   560.4 0.178E+00   4.47    39.65    4.47    0.00   .43373E+05
   4368.29     9.14    4.47   563.9 0.177E+00   4.47    39.90    4.47    0.00   .44786E+05
   4506.80     9.14    4.47   567.4 0.176E+00   4.47    40.14    4.47    0.00   .46199E+05
   4645.31     9.14    4.47   570.8 0.175E+00   4.47    40.38    4.47    0.00   .47612E+05
   4783.82     9.14    4.47   574.2 0.174E+00   4.47    40.63    4.47    0.00   .49025E+05
   4922.33     9.14    4.47   577.6 0.173E+00   4.47    40.87    4.47    0.00   .50438E+05
   5060.84     9.14    4.47   581.0 0.172E+00   4.47    41.10    4.47    0.00   .51851E+05
   5199.36     9.14    4.47   584.3 0.171E+00   4.47    41.34    4.47    0.00   .53264E+05
   5337.87     9.14    4.47   587.6 0.170E+00   4.47    41.58    4.47    0.00   .54678E+05
   5476.38     9.14    4.47   591.0 0.169E+00   4.47    41.81    4.47    0.00   .56091E+05
   5614.89     9.14    4.47   594.2 0.168E+00   4.47    42.04    4.47    0.00   .57504E+05
   5753.40     9.14    4.47   597.5 0.167E+00   4.47    42.28    4.47    0.00   .58917E+05
   5891.91     9.14    4.47   600.8 0.166E+00   4.47    42.51    4.47    0.00   .60330E+05
   6030.42     9.14    4.47   604.0 0.166E+00   4.47    42.74    4.47    0.00   .61743E+05
   6168.93     9.14    4.47   607.3 0.165E+00   4.47    42.96    4.47    0.00   .63156E+05
   6307.45     9.14    4.47   610.5 0.164E+00   4.47    43.19    4.47    0.00   .64569E+05
   6445.96     9.14    4.47   613.6 0.163E+00   4.47    43.42    4.47    0.00   .65982E+05
   6584.47     9.14    4.47   616.8 0.162E+00   4.47    43.64    4.47    0.00   .67395E+05
   6722.98     9.14    4.47   620.0 0.161E+00   4.47    43.87    4.47    0.00   .68808E+05
   6861.49     9.14    4.47   623.1 0.160E+00   4.47    44.09    4.47    0.00   .70222E+05
   7000.00     9.14    4.47   626.2 0.160E+00   4.47    44.31    4.47    0.00   .71635E+05
 Cumulative travel time =       71634.6406 sec  (   19.90 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario4
 FILE NAME:         E:\Projets\Nemaska\Scenarios\4\S4_Q22lps.prd
 Time stamp:        Wed Dec 17 08:56:38 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2800.00  QA    =    131.60  ICHREG= 1
 HA    =      4.00  HD    =      4.00
 UA    =      0.047 F     =      0.005 USTAR =0.1168E-02
 UW    =      1.600 UWSTAR=0.1741E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.1011

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  RIGHT     DISTB =    177.50  YB1   =    125.00  YB2   =    230.00
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.75
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    135.57  THETA =      0.00  SIGMA =     10.57  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.1011  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.04
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.41  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     12.42  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     12.42
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU4    2
 2  Applicable layer depth HS =     4.00  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       177.50 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.537   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

 The diffuser near-field dilution is REDUCED because of the PROXIMITY
   of the shoreline.
 Because of the strong ambient current the diffuser plume of this crossflowing
   discharge gets RAPIDLY DEFLECTED.
 A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
   layer depth.  Full mixing is achieved at a downstream distance of about
   five (5) layer depths.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, measured horizontally in Y-direction
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.25	1.0	0.100E+03	0.00	75.00	.00000E+00
1.47	0.00	0.38	70.5	0.142E+01	0.08	74.08	.31301E+02
2.94	0.01	0.51	99.2	0.101E+01	0.16	73.15	.62603E+02
4.41	0.01	0.64	121.3	0.824E+00	0.24	72.23	.93904E+02
5.88	0.01	0.76	139.9	0.715E+00	0.32	71.30	.12521E+03
7.36	0.01	0.89	156.3	0.640E+00	0.40	70.38	.15651E+03
8.83	0.02	1.02	171.2	0.584E+00	0.48	69.46	.18781E+03
10.30	0.02	1.15	184.8	0.541E+00	0.56	68.53	.21911E+03
11.77	0.02	1.28	197.5	0.506E+00	0.64	67.61	.25041E+03
13.24	0.02	1.41	209.4	0.478E+00	0.72	66.68	.28171E+03
14.71	0.03	1.54	220.7	0.453E+00	0.80	65.76	.31301E+03
16.18	0.03	1.67	231.4	0.432E+00	0.88	64.84	.34431E+03
17.65	0.03	1.79	241.7	0.414E+00	0.96	63.91	.37562E+03
19.13	0.03	1.92	251.5	0.398E+00	1.04	62.99	.40692E+03
20.60	0.04	2.00	260.9	0.383E+00	1.12	62.06	.43822E+03
22.07	0.04	2.00	270.1	0.370E+00	1.20	61.14	.46952E+03
23.54	0.04	2.00	278.9	0.359E+00	1.28	60.22	.50082E+03
25.01	0.05	2.00	287.4	0.348E+00	1.36	59.29	.53212E+03
26.48	0.05	2.00	295.7	0.338E+00	1.44	58.37	.56342E+03
27.95	0.05	2.00	303.8	0.329E+00	1.52	57.44	.59472E+03
29.42	0.05	2.00	311.7	0.321E+00	1.60	56.52	.62603E+03
30.89	0.06	2.00	319.4	0.313E+00	1.68	55.60	.65733E+03
32.37	0.06	2.00	326.9	0.306E+00	1.76	54.67	.68863E+03
33.84	0.06	2.00	334.2	0.299E+00	1.84	53.75	.71993E+03
35.31	0.06	2.00	341.3	0.293E+00	1.92	52.82	.75123E+03
36.78	0.07	2.00	348.4	0.287E+00	2.00	51.90	.78253E+03
38.25	0.07	2.00	355.2	0.281E+00	2.08	50.98	.81383E+03
39.72	0.07	2.00	362.0	0.276E+00	2.16	50.05	.84513E+03
41.19	0.07	2.00	368.6	0.271E+00	2.24	49.13	.87644E+03
42.66	0.08	2.00	375.1	0.267E+00	2.32	48.20	.90774E+03
44.13	0.08	2.00	381.5	0.262E+00	2.40	47.28	.93904E+03
45.61	0.08	2.00	387.8	0.258E+00	2.48	46.36	.97034E+03
47.08	0.09	2.00	394.0	0.254E+00	2.56	45.43	.10016E+04
48.55	0.09	2.00	400.1	0.250E+00	2.64	44.51	.10329E+04
50.02	0.09	2.00	406.1	0.246E+00	2.72	43.59	.10642E+04
51.49	0.09	2.00	412.0	0.243E+00	2.80	42.66	.10955E+04
52.96	0.10	2.00	417.8	0.239E+00	2.88	41.74	.11268E+04
54.43	0.10	2.00	423.6	0.236E+00	2.96	40.81	.11581E+04
55.90	0.10	2.00	429.3	0.233E+00	3.04	39.89	.11894E+04
57.38	0.10	2.00	434.9	0.230E+00	3.12	38.97	.12207E+04
58.85	0.11	2.00	440.4	0.227E+00	3.20	38.04	.12521E+04
60.32	0.11	2.00	445.8	0.224E+00	3.28	37.12	.12834E+04
61.79	0.11	2.00	451.2	0.222E+00	3.36	36.19	.13147E+04
63.26	0.11	2.00	456.6	0.219E+00	3.44	35.27	.13460E+04
64.73	0.12	2.00	461.8	0.217E+00	3.52	34.35	.13773E+04
66.20	0.12	2.00	467.0	0.214E+00	3.60	33.42	.14086E+04
67.67	0.12	2.00	472.2	0.212E+00	3.68	32.50	.14399E+04
69.14	0.13	2.00	477.3	0.210E+00	3.76	31.57	.14712E+04
70.62	0.13	2.00	482.3	0.207E+00	3.84	30.65	.15025E+04
72.09	0.13	2.00	487.3	0.205E+00	3.92	29.73	.15338E+04
73.56	0.13	2.00	492.2	0.203E+00	4.00	28.80	.15651E+04

Cumulative travel time = 1565.0634 sec (0.43 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

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-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.152E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.190E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.56	0.13	4.00	492.2	0.203E+00	4.00	28.80	4.00	0.00	.15651E+04
212.09	0.13	4.00	497.4	0.201E+00	4.00	29.11	4.00	0.00	.45120E+04
350.62	0.13	4.00	502.6	0.199E+00	4.00	29.41	4.00	0.00	.74589E+04
489.14	0.13	4.00	507.7	0.197E+00	4.00	29.70	4.00	0.00	.10406E+05
627.67	0.13	4.00	512.7	0.195E+00	4.00	30.00	4.00	0.00	.13353E+05
766.20	0.13	4.00	517.7	0.193E+00	4.00	30.29	4.00	0.00	.16300E+05
904.73	0.13	4.00	522.7	0.191E+00	4.00	30.58	4.00	0.00	.19247E+05
1043.26	0.13	4.00	527.6	0.190E+00	4.00	30.87	4.00	0.00	.22194E+05
1181.79	0.13	4.00	532.4	0.188E+00	4.00	31.15	4.00	0.00	.25140E+05
1320.32	0.13	4.00	537.2	0.186E+00	4.00	31.43	4.00	0.00	.28087E+05
1458.85	0.13	4.00	542.0	0.185E+00	4.00	31.71	4.00	0.00	.31034E+05
1597.38	0.13	4.00	546.7	0.183E+00	4.00	31.99	4.00	0.00	.33981E+05
1735.90	0.13	4.00	551.4	0.181E+00	4.00	32.26	4.00	0.00	.36928E+05
1874.43	0.13	4.00	556.0	0.180E+00	4.00	32.53	4.00	0.00	.39875E+05
2012.96	0.13	4.00	560.6	0.178E+00	4.00	32.80	4.00	0.00	.42822E+05
2151.49	0.13	4.00	565.2	0.177E+00	4.00	33.07	4.00	0.00	.45769E+05
2290.02	0.13	4.00	569.7	0.176E+00	4.00	33.34	4.00	0.00	.48716E+05
2428.55	0.13	4.00	574.2	0.174E+00	4.00	33.60	4.00	0.00	.51663E+05
2567.08	0.13	4.00	578.7	0.173E+00	4.00	33.86	4.00	0.00	.54610E+05
2705.61	0.13	4.00	583.1	0.171E+00	4.00	34.12	4.00	0.00	.57557E+05
2844.13	0.13	4.00	587.5	0.170E+00	4.00	34.38	4.00	0.00	.60504E+05
2982.66	0.13	4.00	591.9	0.169E+00	4.00	34.63	4.00	0.00	.63451E+05
3121.19	0.13	4.00	596.2	0.168E+00	4.00	34.88	4.00	0.00	.66398E+05
3259.72	0.13	4.00	600.5	0.167E+00	4.00	35.14	4.00	0.00	.69344E+05
3398.25	0.13	4.00	604.8	0.165E+00	4.00	35.39	4.00	0.00	.72291E+05
3536.78	0.13	4.00	609.0	0.164E+00	4.00	35.63	4.00	0.00	.75238E+05

3675.31	0.13	4.00	613.2	0.163E+00	4.00	35.88	4.00	0.00	.78185E+05
3813.84	0.13	4.00	617.4	0.162E+00	4.00	36.12	4.00	0.00	.81132E+05
3952.36	0.13	4.00	621.6	0.161E+00	4.00	36.37	4.00	0.00	.84079E+05
4090.89	0.13	4.00	625.7	0.160E+00	4.00	36.61	4.00	0.00	.87026E+05
4229.42	0.13	4.00	629.8	0.159E+00	4.00	36.85	4.00	0.00	.89973E+05
4367.95	0.13	4.00	633.8	0.158E+00	4.00	37.09	4.00	0.00	.92920E+05
4506.48	0.13	4.00	637.9	0.157E+00	4.00	37.32	4.00	0.00	.95867E+05
4645.01	0.13	4.00	641.9	0.156E+00	4.00	37.56	4.00	0.00	.98814E+05
4783.54	0.13	4.00	645.9	0.155E+00	4.00	37.79	4.00	0.00	.10176E+06
4922.07	0.13	4.00	649.9	0.154E+00	4.00	38.02	4.00	0.00	.10471E+06
5060.60	0.13	4.00	653.8	0.153E+00	4.00	38.26	4.00	0.00	.10765E+06
5199.12	0.13	4.00	657.7	0.152E+00	4.00	38.48	4.00	0.00	.11060E+06
5337.65	0.13	4.00	661.6	0.151E+00	4.00	38.71	4.00	0.00	.11355E+06
5476.18	0.13	4.00	665.5	0.150E+00	4.00	38.94	4.00	0.00	.11650E+06
5614.71	0.13	4.00	669.4	0.149E+00	4.00	39.17	4.00	0.00	.11944E+06
5753.24	0.13	4.00	673.2	0.149E+00	4.00	39.39	4.00	0.00	.12239E+06
5891.77	0.13	4.00	677.0	0.148E+00	4.00	39.61	4.00	0.00	.12534E+06
6030.30	0.13	4.00	680.8	0.147E+00	4.00	39.83	4.00	0.00	.12828E+06
6168.83	0.13	4.00	684.6	0.146E+00	4.00	40.05	4.00	0.00	.13123E+06
6307.35	0.13	4.00	688.3	0.145E+00	4.00	40.27	4.00	0.00	.13418E+06
6445.88	0.13	4.00	692.0	0.145E+00	4.00	40.49	4.00	0.00	.13712E+06
6584.41	0.13	4.00	695.7	0.144E+00	4.00	40.71	4.00	0.00	.14007E+06
6722.94	0.13	4.00	699.4	0.143E+00	4.00	40.92	4.00	0.00	.14302E+06
6861.47	0.13	4.00	703.1	0.142E+00	4.00	41.14	4.00	0.00	.14596E+06
7000.00	0.13	4.00	706.8	0.141E+00	4.00	41.35	4.00	0.00	.14891E+06

```
 Cumulative travel time =      148911.5469 sec  (   41.36 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario4
 FILE NAME:         E:\Projets\Nemaska\Scenarios\4\S4_Q40lps.prd
 Time stamp:        Wed Dec 17 08:56:54 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2800.00  QA    =    131.60  ICHREG= 1
 HA    =      4.00  HD    =      4.00
 UA    =      0.047 F     =      0.005 USTAR =0.1168E-02
 UW    =      1.600 UWSTAR=0.1741E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.1011

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  RIGHT     DISTB =    177.50  YB1   =    125.00  YB2   =    230.00
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.75
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    135.57  THETA =      0.00  SIGMA =     10.57  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.1011  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.13
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      4.38  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     22.58  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     22.58
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 2222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU4    2
 2  Applicable layer depth HS =     4.00  2
 2222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       177.50 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.015   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

 The diffuser near-field dilution is REDUCED because of the PROXIMITY
   of the shoreline.
 Because of the strong ambient current the diffuser plume of this crossflowing
   discharge gets RAPIDLY DEFLECTED.
 A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
   layer depth.  Full mixing is achieved at a downstream distance of about
   five (5) layer depths.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, measured horizontally in Y-direction
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.25	1.0	0.100E+03	0.00	75.00	.00000E+00
1.47	0.01	0.38	40.0	0.250E+01	0.08	74.09	.31301E+02
2.94	0.02	0.51	56.1	0.178E+01	0.16	73.18	.62603E+02
4.41	0.03	0.64	68.5	0.146E+01	0.24	72.27	.93904E+02
5.88	0.04	0.76	79.0	0.127E+01	0.32	71.35	.12521E+03
7.36	0.04	0.89	88.2	0.113E+01	0.40	70.44	.15651E+03
8.83	0.05	1.02	96.5	0.104E+01	0.48	69.53	.18781E+03
10.30	0.06	1.15	104.1	0.960E+00	0.56	68.62	.21911E+03
11.77	0.07	1.28	111.2	0.899E+00	0.64	67.71	.25041E+03
13.24	0.08	1.41	117.9	0.848E+00	0.72	66.80	.28171E+03
14.71	0.09	1.54	124.3	0.805E+00	0.80	65.89	.31301E+03
16.18	0.10	1.67	130.3	0.768E+00	0.88	64.97	.34431E+03
17.65	0.11	1.79	136.0	0.735E+00	0.96	64.06	.37562E+03
19.13	0.11	1.92	141.5	0.707E+00	1.04	63.15	.40692E+03
20.60	0.12	2.00	146.8	0.681E+00	1.12	62.24	.43822E+03
22.07	0.13	2.00	152.0	0.658E+00	1.20	61.33	.46952E+03
23.54	0.14	2.00	156.9	0.637E+00	1.28	60.42	.50082E+03
25.01	0.15	2.00	161.7	0.618E+00	1.36	59.50	.53212E+03
26.48	0.16	2.00	166.4	0.601E+00	1.44	58.59	.56342E+03
27.95	0.17	2.00	170.9	0.585E+00	1.52	57.68	.59472E+03
29.42	0.18	2.00	175.3	0.570E+00	1.60	56.77	.62603E+03
30.89	0.19	2.00	179.6	0.557E+00	1.68	55.86	.65733E+03
32.37	0.19	2.00	183.8	0.544E+00	1.76	54.95	.68863E+03
33.84	0.20	2.00	187.9	0.532E+00	1.84	54.04	.71993E+03
35.31	0.21	2.00	191.9	0.521E+00	1.92	53.12	.75123E+03
36.78	0.22	2.00	195.9	0.511E+00	2.00	52.21	.78253E+03
38.25	0.23	2.00	199.7	0.501E+00	2.08	51.30	.81383E+03
39.72	0.24	2.00	203.5	0.491E+00	2.16	50.39	.84513E+03
41.19	0.25	2.00	207.2	0.483E+00	2.24	49.48	.87644E+03
42.66	0.26	2.00	210.9	0.474E+00	2.32	48.57	.90774E+03
44.13	0.26	2.00	214.5	0.466E+00	2.40	47.66	.93904E+03
45.61	0.27	2.00	218.0	0.459E+00	2.48	46.74	.97034E+03
47.08	0.28	2.00	221.5	0.452E+00	2.56	45.83	.10016E+04
48.55	0.29	2.00	224.9	0.445E+00	2.64	44.92	.10329E+04
50.02	0.30	2.00	228.3	0.438E+00	2.72	44.01	.10642E+04
51.49	0.31	2.00	231.6	0.432E+00	2.80	43.10	.10955E+04
52.96	0.32	2.00	234.9	0.426E+00	2.88	42.19	.11268E+04
54.43	0.33	2.00	238.1	0.420E+00	2.96	41.27	.11581E+04
55.90	0.33	2.00	241.3	0.414E+00	3.04	40.36	.11894E+04
57.38	0.34	2.00	244.4	0.409E+00	3.12	39.45	.12207E+04
58.85	0.35	2.00	247.5	0.404E+00	3.20	38.54	.12521E+04
60.32	0.36	2.00	250.6	0.399E+00	3.28	37.63	.12834E+04
61.79	0.37	2.00	253.6	0.394E+00	3.36	36.72	.13147E+04
63.26	0.38	2.00	256.6	0.390E+00	3.44	35.81	.13460E+04
64.73	0.39	2.00	259.5	0.385E+00	3.52	34.89	.13773E+04
66.20	0.40	2.00	262.5	0.381E+00	3.60	33.98	.14086E+04
67.67	0.41	2.00	265.3	0.377E+00	3.68	33.07	.14399E+04
69.14	0.41	2.00	268.2	0.373E+00	3.76	32.16	.14712E+04
70.62	0.42	2.00	271.0	0.369E+00	3.84	31.25	.15025E+04
72.09	0.43	2.00	273.8	0.365E+00	3.92	30.34	.15338E+04
73.56	0.44	2.00	276.6	0.362E+00	4.00	29.43	.15651E+04

Cumulative travel time = 1565.0634 sec (0.43 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

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** End of NEAR-FIELD REGION (NFR) **
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.152E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.190E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.56	0.44	4.00	276.6	0.362E+00	4.00	29.43	4.00	0.00	.15651E+04
212.09	0.44	4.00	279.4	0.358E+00	4.00	29.72	4.00	0.00	.45116E+04
350.62	0.44	4.00	282.2	0.354E+00	4.00	30.02	4.00	0.00	.74581E+04
489.14	0.44	4.00	284.9	0.351E+00	4.00	30.31	4.00	0.00	.10405E+05
627.67	0.44	4.00	287.6	0.348E+00	4.00	30.60	4.00	0.00	.13351E+05
766.20	0.44	4.00	290.3	0.344E+00	4.00	30.89	4.00	0.00	.16298E+05
904.73	0.44	4.00	293.0	0.341E+00	4.00	31.17	4.00	0.00	.19244E+05
1043.26	0.44	4.00	295.6	0.338E+00	4.00	31.45	4.00	0.00	.22191E+05
1181.79	0.44	4.00	298.3	0.335E+00	4.00	31.73	4.00	0.00	.25137E+05
1320.32	0.44	4.00	300.8	0.332E+00	4.00	32.01	4.00	0.00	.28084E+05
1458.85	0.44	4.00	303.4	0.330E+00	4.00	32.28	4.00	0.00	.31030E+05
1597.38	0.44	4.00	306.0	0.327E+00	4.00	32.55	4.00	0.00	.33977E+05
1735.90	0.44	4.00	308.5	0.324E+00	4.00	32.82	4.00	0.00	.36923E+05
1874.43	0.44	4.00	311.0	0.322E+00	4.00	33.09	4.00	0.00	.39870E+05
2012.96	0.44	4.00	313.5	0.319E+00	4.00	33.35	4.00	0.00	.42816E+05
2151.49	0.44	4.00	316.0	0.316E+00	4.00	33.62	4.00	0.00	.45763E+05
2290.02	0.44	4.00	318.4	0.314E+00	4.00	33.88	4.00	0.00	.48709E+05
2428.55	0.44	4.00	320.9	0.312E+00	4.00	34.13	4.00	0.00	.51656E+05
2567.08	0.44	4.00	323.3	0.309E+00	4.00	34.39	4.00	0.00	.54603E+05
2705.61	0.44	4.00	325.7	0.307E+00	4.00	34.65	4.00	0.00	.57549E+05
2844.13	0.44	4.00	328.1	0.305E+00	4.00	34.90	4.00	0.00	.60496E+05
2982.66	0.44	4.00	330.4	0.303E+00	4.00	35.15	4.00	0.00	.63442E+05
3121.19	0.44	4.00	332.8	0.301E+00	4.00	35.40	4.00	0.00	.66389E+05
3259.72	0.44	4.00	335.1	0.298E+00	4.00	35.65	4.00	0.00	.69335E+05
3398.25	0.44	4.00	337.4	0.296E+00	4.00	35.89	4.00	0.00	.72282E+05
3536.78	0.44	4.00	339.7	0.294E+00	4.00	36.14	4.00	0.00	.75228E+05

```
   3675.31      0.44     4.00    342.0 0.292E+00   4.00     36.38     4.00     0.00    .78175E+05
   3813.84      0.44     4.00    344.3 0.290E+00   4.00     36.62     4.00     0.00    .81121E+05
   3952.36      0.44     4.00    346.5 0.289E+00   4.00     36.86     4.00     0.00    .84068E+05
   4090.89      0.44     4.00    348.7 0.287E+00   4.00     37.10     4.00     0.00    .87014E+05
   4229.42      0.44     4.00    351.0 0.285E+00   4.00     37.34     4.00     0.00    .89961E+05
   4367.95      0.44     4.00    353.2 0.283E+00   4.00     37.57     4.00     0.00    .92907E+05
   4506.48      0.44     4.00    355.4 0.281E+00   4.00     37.81     4.00     0.00    .95854E+05
   4645.01      0.44     4.00    357.6 0.280E+00   4.00     38.04     4.00     0.00    .98800E+05
   4783.54      0.44     4.00    359.7 0.278E+00   4.00     38.27     4.00     0.00    .10175E+06
   4922.07      0.44     4.00    361.9 0.276E+00   4.00     38.50     4.00     0.00    .10469E+06
   5060.60      0.44     4.00    364.0 0.275E+00   4.00     38.73     4.00     0.00    .10764E+06
   5199.12      0.44     4.00    366.2 0.273E+00   4.00     38.95     4.00     0.00    .11059E+06
   5337.65      0.44     4.00    368.3 0.272E+00   4.00     39.18     4.00     0.00    .11353E+06
   5476.18      0.44     4.00    370.4 0.270E+00   4.00     39.40     4.00     0.00    .11648E+06
   5614.71      0.44     4.00    372.5 0.268E+00   4.00     39.63     4.00     0.00    .11943E+06
   5753.24      0.44     4.00    374.6 0.267E+00   4.00     39.85     4.00     0.00    .12237E+06
   5891.77      0.44     4.00    376.6 0.266E+00   4.00     40.07     4.00     0.00    .12532E+06
   6030.30      0.44     4.00    378.7 0.264E+00   4.00     40.29     4.00     0.00    .12827E+06
   6168.83      0.44     4.00    380.7 0.263E+00   4.00     40.50     4.00     0.00    .13121E+06
   6307.35      0.44     4.00    382.8 0.261E+00   4.00     40.72     4.00     0.00    .13416E+06
   6445.88      0.44     4.00    384.8 0.260E+00   4.00     40.94     4.00     0.00    .13711E+06
   6584.41      0.44     4.00    386.8 0.259E+00   4.00     41.15     4.00     0.00    .14005E+06
   6722.94      0.44     4.00    388.8 0.257E+00   4.00     41.36     4.00     0.00    .14300E+06
   6861.47      0.44     4.00    390.8 0.256E+00   4.00     41.58     4.00     0.00    .14594E+06
   7000.00      0.44     4.00    392.8 0.255E+00   4.00     41.79     4.00     0.00    .14889E+06
 Cumulative travel time =      148891.3906 sec  (   41.36 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario4
 FILE NAME:         E:\Projets\Nemaska\Scenarios\4\S4_Q62lps.prd
 Time stamp:        Wed Dec 17 08:57:09 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2800.00  QA    =    131.60  ICHREG= 1
 HA    =      4.00  HD    =      4.00
 UA    =      0.047 F     =      0.005 USTAR =0.1168E-02
 UW    =      1.600 UWSTAR=0.1741E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.1011

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  RIGHT     DISTB =    177.50  YB1   =    125.00  YB2   =    230.00
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.75
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    135.57  THETA =      0.00  SIGMA =     10.57  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.1011  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.31
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      6.79  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     34.99  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     34.99
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU4    2
 2  Applicable layer depth HS =     4.00  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       177.50 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.598   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

 The diffuser near-field dilution is REDUCED because of the PROXIMITY
   of the shoreline.
 Because of the strong ambient current the diffuser plume of this crossflowing
   discharge gets RAPIDLY DEFLECTED.
 A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
   layer depth.  Full mixing is achieved at a downstream distance of about
   five (5) layer depths.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, measured horizontally in Y-direction
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.25	1.0	0.100E+03	0.00	75.00	.00000E+00
1.47	0.02	0.38	27.1	0.369E+01	0.08	74.11	.31301E+02
2.94	0.04	0.51	37.9	0.264E+01	0.16	73.22	.62603E+02
4.41	0.06	0.64	46.2	0.216E+01	0.24	72.34	.93904E+02
5.88	0.08	0.76	53.2	0.188E+01	0.32	71.45	.12521E+03
7.36	0.11	0.89	59.4	0.168E+01	0.40	70.56	.15651E+03
8.83	0.13	1.02	65.0	0.154E+01	0.48	69.67	.18781E+03
10.30	0.15	1.15	70.1	0.143E+01	0.56	68.79	.21911E+03
11.77	0.17	1.28	74.9	0.134E+01	0.64	67.90	.25041E+03
13.24	0.19	1.41	79.3	0.126E+01	0.72	67.01	.28171E+03
14.71	0.21	1.54	83.6	0.120E+01	0.80	66.12	.31301E+03
16.18	0.23	1.67	87.6	0.114E+01	0.88	65.23	.34431E+03
17.65	0.25	1.79	91.4	0.109E+01	0.96	64.35	.37562E+03
19.13	0.28	1.92	95.1	0.105E+01	1.04	63.46	.40692E+03
20.60	0.30	2.00	98.7	0.101E+01	1.12	62.57	.43822E+03
22.07	0.32	2.00	102.1	0.979E+00	1.20	61.68	.46952E+03
23.54	0.34	2.00	105.4	0.948E+00	1.28	60.79	.50082E+03
25.01	0.36	2.00	108.7	0.920E+00	1.36	59.91	.53212E+03
26.48	0.38	2.00	111.8	0.895E+00	1.44	59.02	.56342E+03
27.95	0.40	2.00	114.8	0.871E+00	1.52	58.13	.59472E+03
29.42	0.42	2.00	117.8	0.849E+00	1.60	57.24	.62603E+03
30.89	0.44	2.00	120.7	0.829E+00	1.68	56.36	.65733E+03
32.37	0.47	2.00	123.5	0.810E+00	1.76	55.47	.68863E+03
33.84	0.49	2.00	126.2	0.792E+00	1.84	54.58	.71993E+03
35.31	0.51	2.00	128.9	0.776E+00	1.92	53.69	.75123E+03
36.78	0.53	2.00	131.6	0.760E+00	2.00	52.80	.78253E+03
38.25	0.55	2.00	134.1	0.746E+00	2.08	51.92	.81383E+03
39.72	0.57	2.00	136.7	0.732E+00	2.16	51.03	.84513E+03
41.19	0.59	2.00	139.2	0.719E+00	2.24	50.14	.87644E+03
42.66	0.61	2.00	141.6	0.706E+00	2.32	49.25	.90774E+03
44.13	0.64	2.00	144.0	0.694E+00	2.40	48.37	.93904E+03
45.61	0.66	2.00	146.4	0.683E+00	2.48	47.48	.97034E+03
47.08	0.68	2.00	148.7	0.672E+00	2.56	46.59	.10016E+04
48.55	0.70	2.00	151.0	0.662E+00	2.64	45.70	.10329E+04
50.02	0.72	2.00	153.2	0.653E+00	2.72	44.81	.10642E+04
51.49	0.74	2.00	155.5	0.643E+00	2.80	43.93	.10955E+04
52.96	0.76	2.00	157.7	0.634E+00	2.88	43.04	.11268E+04
54.43	0.78	2.00	159.8	0.626E+00	2.96	42.15	.11581E+04
55.90	0.80	2.00	162.0	0.617E+00	3.04	41.26	.11894E+04
57.38	0.83	2.00	164.1	0.610E+00	3.12	40.37	.12207E+04
58.85	0.85	2.00	166.1	0.602E+00	3.20	39.49	.12521E+04
60.32	0.87	2.00	168.2	0.595E+00	3.28	38.60	.12834E+04
61.79	0.89	2.00	170.2	0.587E+00	3.36	37.71	.13147E+04
63.26	0.91	2.00	172.2	0.581E+00	3.44	36.82	.13460E+04
64.73	0.93	2.00	174.2	0.574E+00	3.52	35.94	.13773E+04
66.20	0.95	2.00	176.2	0.568E+00	3.60	35.05	.14086E+04
67.67	0.97	2.00	178.1	0.562E+00	3.68	34.16	.14399E+04
69.14	0.99	2.00	180.0	0.556E+00	3.76	33.27	.14712E+04
70.62	1.02	2.00	181.9	0.550E+00	3.84	32.38	.15025E+04
72.09	1.04	2.00	183.8	0.544E+00	3.92	31.50	.15338E+04
73.56	1.06	2.00	185.6	0.539E+00	4.00	30.61	.15651E+04

Cumulative travel time = 1565.0634 sec (0.43 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

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** End of NEAR-FIELD REGION (NFR) **
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.152E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.190E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.56	1.06	4.00	185.6	0.539E+00	4.00	30.61	4.00	0.00	.15651E+04
212.09	1.06	4.00	187.4	0.534E+00	4.00	30.89	4.00	0.00	.45111E+04
350.62	1.06	4.00	189.1	0.529E+00	4.00	31.18	4.00	0.00	.74571E+04
489.14	1.06	4.00	190.8	0.524E+00	4.00	31.46	4.00	0.00	.10403E+05
627.67	1.06	4.00	192.5	0.520E+00	4.00	31.74	4.00	0.00	.13349E+05
766.20	1.06	4.00	194.2	0.515E+00	4.00	32.01	4.00	0.00	.16295E+05
904.73	1.06	4.00	195.8	0.511E+00	4.00	32.29	4.00	0.00	.19241E+05
1043.26	1.06	4.00	197.5	0.506E+00	4.00	32.56	4.00	0.00	.22187E+05
1181.79	1.06	4.00	199.1	0.502E+00	4.00	32.83	4.00	0.00	.25133E+05
1320.32	1.06	4.00	200.7	0.498E+00	4.00	33.10	4.00	0.00	.28079E+05
1458.85	1.06	4.00	202.3	0.494E+00	4.00	33.36	4.00	0.00	.31025E+05
1597.38	1.06	4.00	203.9	0.490E+00	4.00	33.62	4.00	0.00	.33971E+05
1735.90	1.06	4.00	205.5	0.487E+00	4.00	33.88	4.00	0.00	.36917E+05
1874.43	1.06	4.00	207.1	0.483E+00	4.00	34.14	4.00	0.00	.39864E+05
2012.96	1.06	4.00	208.6	0.479E+00	4.00	34.40	4.00	0.00	.42810E+05
2151.49	1.06	4.00	210.2	0.476E+00	4.00	34.65	4.00	0.00	.45756E+05
2290.02	1.06	4.00	211.7	0.472E+00	4.00	34.91	4.00	0.00	.48702E+05
2428.55	1.06	4.00	213.2	0.469E+00	4.00	35.16	4.00	0.00	.51648E+05
2567.08	1.06	4.00	214.7	0.466E+00	4.00	35.41	4.00	0.00	.54594E+05
2705.61	1.06	4.00	216.2	0.462E+00	4.00	35.66	4.00	0.00	.57540E+05
2844.13	1.06	4.00	217.7	0.459E+00	4.00	35.90	4.00	0.00	.60486E+05
2982.66	1.06	4.00	219.2	0.456E+00	4.00	36.15	4.00	0.00	.63432E+05
3121.19	1.06	4.00	220.7	0.453E+00	4.00	36.39	4.00	0.00	.66378E+05
3259.72	1.06	4.00	222.1	0.450E+00	4.00	36.63	4.00	0.00	.69324E+05
3398.25	1.06	4.00	223.6	0.447E+00	4.00	36.87	4.00	0.00	.72270E+05
3536.78	1.06	4.00	225.0	0.444E+00	4.00	37.11	4.00	0.00	.75216E+05

3675.31	1.06	4.00	226.5	0.442E+00	4.00	37.34	4.00	0.00	.78162E+05
3813.84	1.06	4.00	227.9	0.439E+00	4.00	37.58	4.00	0.00	.81108E+05
3952.36	1.06	4.00	229.3	0.436E+00	4.00	37.81	4.00	0.00	.84054E+05
4090.89	1.06	4.00	230.7	0.433E+00	4.00	38.04	4.00	0.00	.87000E+05
4229.42	1.06	4.00	232.1	0.431E+00	4.00	38.28	4.00	0.00	.89946E+05
4367.95	1.06	4.00	233.5	0.428E+00	4.00	38.50	4.00	0.00	.92892E+05
4506.48	1.06	4.00	234.9	0.426E+00	4.00	38.73	4.00	0.00	.95838E+05
4645.01	1.06	4.00	236.3	0.423E+00	4.00	38.96	4.00	0.00	.98784E+05
4783.54	1.06	4.00	237.6	0.421E+00	4.00	39.18	4.00	0.00	.10173E+06
4922.07	1.06	4.00	239.0	0.418E+00	4.00	39.41	4.00	0.00	.10468E+06
5060.60	1.06	4.00	240.3	0.416E+00	4.00	39.63	4.00	0.00	.10762E+06
5199.12	1.06	4.00	241.7	0.414E+00	4.00	39.85	4.00	0.00	.11057E+06
5337.65	1.06	4.00	243.0	0.411E+00	4.00	40.07	4.00	0.00	.11351E+06
5476.18	1.06	4.00	244.4	0.409E+00	4.00	40.29	4.00	0.00	.11646E+06
5614.71	1.06	4.00	245.7	0.407E+00	4.00	40.51	4.00	0.00	.11941E+06
5753.24	1.06	4.00	247.0	0.405E+00	4.00	40.73	4.00	0.00	.12235E+06
5891.77	1.06	4.00	248.3	0.403E+00	4.00	40.94	4.00	0.00	.12530E+06
6030.30	1.06	4.00	249.6	0.401E+00	4.00	41.16	4.00	0.00	.12824E+06
6168.83	1.06	4.00	250.9	0.399E+00	4.00	41.37	4.00	0.00	.13119E+06
6307.35	1.06	4.00	252.2	0.397E+00	4.00	41.58	4.00	0.00	.13414E+06
6445.88	1.06	4.00	253.5	0.395E+00	4.00	41.79	4.00	0.00	.13708E+06
6584.41	1.06	4.00	254.7	0.393E+00	4.00	42.00	4.00	0.00	.14003E+06
6722.94	1.06	4.00	256.0	0.391E+00	4.00	42.21	4.00	0.00	.14297E+06
6861.47	1.06	4.00	257.3	0.389E+00	4.00	42.42	4.00	0.00	.14592E+06
7000.00	1.06	4.00	258.5	0.387E+00	4.00	42.63	4.00	0.00	.14887E+06

Cumulative travel time = 148866.7812 sec (41.35 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario5
 FILE NAME:         E:\Projets\Nemaska\Scenarios\5\S5_Q22lps.prd
 Time stamp:        Tue Dec 16 09:30:13 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2940.00  QA    =    220.50  ICHREG= 1
 HA    =      4.20  HD    =      4.20
 UA    =      0.075 F     =      0.005 USTAR =0.1849E-02
 UW    =      3.300 UWSTAR=0.3742E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.7019

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    178.20  YB1   =    125.00  YB2   =    231.40
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.95
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    134.80  THETA =      0.00  SIGMA =      9.80  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.7019  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.51  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      7.78  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      7.78
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.20  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       178.20 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.510   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.20m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.48     0.26    0.38   161.4 0.620E+00   0.30    74.97 .26393E+02
```

2.96	0.51	0.51	227.8	0.439E+00	0.60	74.95	.53783E+02
4.43	0.77	0.65	278.8	0.359E+00	0.90	74.92	.81358E+02
5.91	1.02	0.78	321.8	0.311E+00	1.20	74.90	.10903E+03
7.39	1.28	0.91	359.6	0.278E+00	1.50	74.88	.13676E+03
8.87	1.53	1.04	393.9	0.254E+00	1.80	74.86	.16454E+03
10.35	1.79	1.17	425.3	0.235E+00	2.10	74.84	.19234E+03
11.82	2.04	1.31	454.6	0.220E+00	2.40	74.82	.22018E+03
13.30	2.30	1.44	482.2	0.207E+00	2.70	74.80	.24803E+03
14.78	2.55	1.57	508.2	0.197E+00	3.00	74.78	.27591E+03
16.26	2.81	1.70	532.9	0.188E+00	3.30	74.77	.30380E+03
17.74	3.06	1.84	556.6	0.180E+00	3.60	74.75	.33170E+03
19.22	3.32	1.97	579.3	0.173E+00	3.90	74.74	.35961E+03
20.69	3.57	2.10	601.1	0.166E+00	4.20	74.72	.38754E+03
22.17	3.83	2.10	622.2	0.161E+00	4.20	74.71	.41547E+03
23.65	4.09	2.10	642.5	0.156E+00	4.20	74.70	.44341E+03
25.13	4.34	2.10	662.3	0.151E+00	4.20	74.69	.47136E+03
26.61	4.60	2.10	681.5	0.147E+00	4.20	74.68	.49931E+03
28.08	4.85	2.10	700.1	0.143E+00	4.20	74.67	.52728E+03
29.56	5.11	2.10	718.3	0.139E+00	4.20	74.66	.55524E+03
31.04	5.36	2.10	736.0	0.136E+00	4.20	74.65	.58322E+03
32.52	5.62	2.10	753.3	0.133E+00	4.20	74.64	.61120E+03
34.00	5.87	2.10	770.2	0.130E+00	4.20	74.63	.63918E+03
35.47	6.13	2.10	786.7	0.127E+00	4.20	74.62	.66717E+03
36.95	6.38	2.10	802.9	0.125E+00	4.20	74.61	.69516E+03
38.43	6.64	2.10	818.8	0.122E+00	4.20	74.60	.72315E+03
39.91	6.89	2.10	834.4	0.120E+00	4.20	74.60	.75115E+03
41.39	7.15	2.10	849.7	0.118E+00	4.20	74.59	.77915E+03
42.87	7.40	2.10	849.7	0.118E+00	4.20	74.58	.80698E+03
44.34	7.66	2.10	849.7	0.118E+00	4.20	74.58	.83481E+03
45.82	7.91	2.10	849.7	0.118E+00	4.20	74.57	.86264E+03
47.30	8.17	2.10	849.7	0.118E+00	4.20	74.56	.89046E+03
48.78	8.43	2.10	849.7	0.118E+00	4.20	74.56	.91829E+03
50.26	8.68	2.10	849.7	0.118E+00	4.20	74.55	.94612E+03
51.73	8.94	2.10	849.7	0.118E+00	4.20	74.55	.97394E+03
53.21	9.19	2.10	849.7	0.118E+00	4.20	74.55	.10018E+04
54.69	9.45	2.10	849.7	0.118E+00	4.20	74.54	.10296E+04
56.17	9.70	2.10	849.7	0.118E+00	4.20	74.54	.10574E+04
57.65	9.96	2.10	849.7	0.118E+00	4.20	74.54	.10853E+04
59.12	10.21	2.10	849.7	0.118E+00	4.20	74.53	.11131E+04
60.60	10.47	2.10	849.7	0.118E+00	4.20	74.53	.11409E+04
62.08	10.72	2.10	849.7	0.118E+00	4.20	74.53	.11687E+04
63.56	10.98	2.10	849.7	0.118E+00	4.20	74.53	.11966E+04
65.04	11.23	2.10	849.7	0.118E+00	4.20	74.53	.12244E+04
66.52	11.49	2.10	849.7	0.118E+00	4.20	74.53	.12522E+04
67.99	11.74	2.10	849.7	0.118E+00	4.20	74.53	.12800E+04
69.47	12.00	2.10	849.7	0.118E+00	4.20	74.52	.13079E+04
70.95	12.26	2.10	849.7	0.118E+00	4.20	74.52	.13357E+04
72.43	12.51	2.10	849.7	0.118E+00	4.20	74.52	.13635E+04
73.91	12.77	2.10	849.7	0.118E+00	4.20	74.52	.13913E+04

Cumulative travel time = 1391.3468 sec (0.39 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.63 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.327E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.408E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.91	12.77	4.20	849.7	0.118E+00	4.20	29.67	4.20	0.00	.13913E+04
212.43	12.77	4.20	861.0	0.116E+00	4.20	30.07	4.20	0.00	.32381E+04
350.95	12.77	4.20	872.2	0.115E+00	4.20	30.46	4.20	0.00	.50849E+04
489.47	12.77	4.20	883.3	0.113E+00	4.20	30.84	4.20	0.00	.69317E+04
627.99	12.77	4.20	894.2	0.112E+00	4.20	31.22	4.20	0.00	.87784E+04
766.52	12.77	4.20	905.0	0.110E+00	4.20	31.60	4.20	0.00	.10625E+05
905.04	12.77	4.20	915.7	0.109E+00	4.20	31.97	4.20	0.00	.12472E+05
1043.56	12.77	4.20	926.3	0.108E+00	4.20	32.34	4.20	0.00	.14319E+05
1182.08	12.77	4.20	936.7	0.107E+00	4.20	32.71	4.20	0.00	.16166E+05
1320.60	12.77	4.20	947.0	0.106E+00	4.20	33.07	4.20	0.00	.18012E+05
1459.12	12.77	4.20	957.2	0.104E+00	4.20	33.42	4.20	0.00	.19859E+05
1597.65	12.77	4.20	967.3	0.103E+00	4.20	33.78	4.20	0.00	.21706E+05
1736.17	12.77	4.20	977.3	0.102E+00	4.20	34.12	4.20	0.00	.23553E+05
1874.69	12.77	4.20	987.2	0.101E+00	4.20	34.47	4.20	0.00	.25399E+05
2013.21	12.77	4.20	997.0	0.100E+00	4.20	34.81	4.20	0.00	.27246E+05
2151.73	12.77	4.20	1006.7	0.993E-01	4.20	35.15	4.20	0.00	.29093E+05
2290.26	12.77	4.20	1016.3	0.984E-01	4.20	35.49	4.20	0.00	.30940E+05

2428.78	12.77	4.20	1025.8	0.975E-01	4.20	35.82	4.20	0.00	.32787E+05
2567.30	12.77	4.20	1035.2	0.966E-01	4.20	36.15	4.20	0.00	.34633E+05
2705.82	12.77	4.20	1044.6	0.957E-01	4.20	36.47	4.20	0.00	.36480E+05
2844.34	12.77	4.20	1053.8	0.949E-01	4.20	36.80	4.20	0.00	.38327E+05
2982.87	12.77	4.20	1063.0	0.941E-01	4.20	37.12	4.20	0.00	.40174E+05
3121.39	12.77	4.20	1072.1	0.933E-01	4.20	37.44	4.20	0.00	.42020E+05
3259.91	12.77	4.20	1081.1	0.925E-01	4.20	37.75	4.20	0.00	.43867E+05
3398.43	12.77	4.20	1090.1	0.917E-01	4.20	38.06	4.20	0.00	.45714E+05
3536.95	12.77	4.20	1099.0	0.910E-01	4.20	38.37	4.20	0.00	.47561E+05
3675.48	12.77	4.20	1107.8	0.903E-01	4.20	38.68	4.20	0.00	.49407E+05
3814.00	12.77	4.20	1116.5	0.896E-01	4.20	38.98	4.20	0.00	.51254E+05
3952.52	12.77	4.20	1125.2	0.889E-01	4.20	39.29	4.20	0.00	.53101E+05
4091.04	12.77	4.20	1133.8	0.882E-01	4.20	39.59	4.20	0.00	.54948E+05
4229.56	12.77	4.20	1142.3	0.875E-01	4.20	39.89	4.20	0.00	.56795E+05
4368.08	12.77	4.20	1150.8	0.869E-01	4.20	40.18	4.20	0.00	.58641E+05
4506.61	12.77	4.20	1159.2	0.863E-01	4.20	40.48	4.20	0.00	.60488E+05
4645.13	12.77	4.20	1167.5	0.857E-01	4.20	40.77	4.20	0.00	.62335E+05
4783.65	12.77	4.20	1175.8	0.850E-01	4.20	41.06	4.20	0.00	.64182E+05
4922.17	12.77	4.20	1184.1	0.845E-01	4.20	41.34	4.20	0.00	.66028E+05
5060.69	12.77	4.20	1192.2	0.839E-01	4.20	41.63	4.20	0.00	.67875E+05
5199.22	12.77	4.20	1200.4	0.833E-01	4.20	41.91	4.20	0.00	.69722E+05
5337.74	12.77	4.20	1208.4	0.828E-01	4.20	42.19	4.20	0.00	.71569E+05
5476.26	12.77	4.20	1216.4	0.822E-01	4.20	42.47	4.20	0.00	.73416E+05
5614.78	12.77	4.20	1224.4	0.817E-01	4.20	42.75	4.20	0.00	.75262E+05
5753.30	12.77	4.20	1232.3	0.811E-01	4.20	43.03	4.20	0.00	.77109E+05
5891.83	12.77	4.20	1240.2	0.806E-01	4.20	43.30	4.20	0.00	.78956E+05
6030.35	12.77	4.20	1248.0	0.801E-01	4.20	43.58	4.20	0.00	.80803E+05
6168.87	12.77	4.20	1255.7	0.796E-01	4.20	43.85	4.20	0.00	.82649E+05
6307.39	12.77	4.20	1263.5	0.791E-01	4.20	44.12	4.20	0.00	.84496E+05
6445.91	12.77	4.20	1271.1	0.787E-01	4.20	44.38	4.20	0.00	.86343E+05
6584.44	12.77	4.20	1278.7	0.782E-01	4.20	44.65	4.20	0.00	.88190E+05
6722.96	12.77	4.20	1286.3	0.777E-01	4.20	44.91	4.20	0.00	.90037E+05
6861.48	12.77	4.20	1293.8	0.773E-01	4.20	45.18	4.20	0.00	.91883E+05
7000.00	12.77	4.20	1301.3	0.768E-01	4.20	45.44	4.20	0.00	.93730E+05

```
 Cumulative travel time =       93730.0625 sec  (   26.04 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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-------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario5
 FILE NAME:         E:\Projets\Nemaska\Scenarios\5\S5_Q40lps.prd
 Time stamp:        Tue Dec 16 09:31:03 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2940.00  QA    =    220.50  ICHREG= 1
 HA    =      4.20  HD    =      4.20
 UA    =      0.075 F     =      0.005 USTAR =0.1849E-02
 UW    =      3.300 UWSTAR=0.3742E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.7019

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    178.20  YB1   =    125.00  YB2   =    231.40
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.95
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    134.80  THETA =      0.00  SIGMA =      9.80  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.7019  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.05
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.75  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.15  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.15
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.20  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       178.20 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.987   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.20m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.48     0.26    0.38    89.8 0.111E+01   0.30    74.91 .23067E+02
```

2.96	0.51	0.51	126.6	0.790E+00	0.60	74.83	.48705E+02
4.43	0.77	0.65	154.9	0.646E+00	0.90	74.75	.74915E+02
5.91	1.02	0.78	178.7	0.560E+00	1.20	74.67	.10143E+03
7.39	1.28	0.91	199.7	0.501E+00	1.50	74.61	.12814E+03
8.87	1.53	1.04	218.6	0.457E+00	1.80	74.54	.15498E+03
10.35	1.79	1.17	236.1	0.424E+00	2.10	74.48	.18194E+03
11.82	2.04	1.31	252.3	0.396E+00	2.40	74.42	.20897E+03
13.30	2.30	1.44	267.5	0.374E+00	2.70	74.36	.23608E+03
14.78	2.55	1.57	282.0	0.355E+00	3.00	74.31	.26325E+03
16.26	2.81	1.70	295.7	0.338E+00	3.30	74.26	.29046E+03
17.74	3.06	1.84	308.8	0.324E+00	3.60	74.21	.31772E+03
19.22	3.32	1.97	321.3	0.311E+00	3.90	74.17	.34501E+03
20.69	3.57	2.10	333.4	0.300E+00	4.20	74.12	.37234E+03
22.17	3.83	2.10	345.1	0.290E+00	4.20	74.08	.39970E+03
23.65	4.09	2.10	356.4	0.281E+00	4.20	74.04	.42708E+03
25.13	4.34	2.10	367.3	0.272E+00	4.20	74.00	.45449E+03
26.61	4.60	2.10	377.9	0.265E+00	4.20	73.97	.48193E+03
28.08	4.85	2.10	388.3	0.258E+00	4.20	73.93	.50938E+03
29.56	5.11	2.10	398.3	0.251E+00	4.20	73.90	.53685E+03
31.04	5.36	2.10	408.1	0.245E+00	4.20	73.87	.56434E+03
32.52	5.62	2.10	417.7	0.239E+00	4.20	73.84	.59185E+03
34.00	5.87	2.10	427.1	0.234E+00	4.20	73.81	.61937E+03
35.47	6.13	2.10	436.3	0.229E+00	4.20	73.79	.64690E+03
36.95	6.38	2.10	445.2	0.225E+00	4.20	73.76	.67445E+03
38.43	6.64	2.10	454.0	0.220E+00	4.20	73.73	.70201E+03
39.91	6.89	2.10	462.7	0.216E+00	4.20	73.71	.72958E+03
41.39	7.15	2.10	471.1	0.212E+00	4.20	73.69	.75717E+03
42.87	7.40	2.10	471.1	0.212E+00	4.20	73.67	.78421E+03
44.34	7.66	2.10	471.1	0.212E+00	4.20	73.65	.81125E+03
45.82	7.91	2.10	471.1	0.212E+00	4.20	73.63	.83829E+03
47.30	8.17	2.10	471.1	0.212E+00	4.20	73.61	.86533E+03
48.78	8.43	2.10	471.1	0.212E+00	4.20	73.60	.89238E+03
50.26	8.68	2.10	471.1	0.212E+00	4.20	73.58	.91942E+03
51.73	8.94	2.10	471.1	0.212E+00	4.20	73.57	.94646E+03
53.21	9.19	2.10	471.1	0.212E+00	4.20	73.56	.97350E+03
54.69	9.45	2.10	471.1	0.212E+00	4.20	73.54	.10005E+04
56.17	9.70	2.10	471.1	0.212E+00	4.20	73.53	.10276E+04
57.65	9.96	2.10	471.1	0.212E+00	4.20	73.53	.10546E+04
59.12	10.21	2.10	471.1	0.212E+00	4.20	73.52	.10817E+04
60.60	10.47	2.10	471.1	0.212E+00	4.20	73.51	.11087E+04
62.08	10.72	2.10	471.1	0.212E+00	4.20	73.50	.11358E+04
63.56	10.98	2.10	471.1	0.212E+00	4.20	73.50	.11628E+04
65.04	11.23	2.10	471.1	0.212E+00	4.20	73.50	.11898E+04
66.52	11.49	2.10	471.1	0.212E+00	4.20	73.49	.12169E+04
67.99	11.74	2.10	471.1	0.212E+00	4.20	73.49	.12439E+04
69.47	12.00	2.10	471.1	0.212E+00	4.20	73.49	.12710E+04
70.95	12.26	2.10	471.1	0.212E+00	4.20	73.48	.12980E+04
72.43	12.51	2.10	471.1	0.212E+00	4.20	73.48	.13250E+04
73.91	12.77	2.10	471.1	0.212E+00	4.20	73.48	.13521E+04

Cumulative travel time = 1352.0846 sec (0.38 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.64 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.327E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.408E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.91	12.77	4.20	471.1	0.212E+00	4.20	29.91	4.20	0.00	.13521E+04
212.43	12.77	4.20	477.3	0.209E+00	4.20	30.30	4.20	0.00	.31987E+04
350.95	12.77	4.20	483.4	0.207E+00	4.20	30.69	4.20	0.00	.50453E+04
489.47	12.77	4.20	489.5	0.204E+00	4.20	31.07	4.20	0.00	.68920E+04
627.99	12.77	4.20	495.5	0.202E+00	4.20	31.45	4.20	0.00	.87386E+04
766.52	12.77	4.20	501.4	0.199E+00	4.20	31.83	4.20	0.00	.10585E+05
905.04	12.77	4.20	507.2	0.197E+00	4.20	32.20	4.20	0.00	.12432E+05
1043.56	12.77	4.20	512.9	0.195E+00	4.20	32.56	4.20	0.00	.14278E+05
1182.08	12.77	4.20	518.6	0.193E+00	4.20	32.92	4.20	0.00	.16125E+05
1320.60	12.77	4.20	524.3	0.191E+00	4.20	33.28	4.20	0.00	.17972E+05
1459.12	12.77	4.20	529.9	0.189E+00	4.20	33.64	4.20	0.00	.19818E+05
1597.65	12.77	4.20	535.4	0.187E+00	4.20	33.99	4.20	0.00	.21665E+05
1736.17	12.77	4.20	540.8	0.185E+00	4.20	34.33	4.20	0.00	.23512E+05
1874.69	12.77	4.20	546.2	0.183E+00	4.20	34.68	4.20	0.00	.25358E+05
2013.21	12.77	4.20	551.6	0.181E+00	4.20	35.02	4.20	0.00	.27205E+05
2151.73	12.77	4.20	556.9	0.180E+00	4.20	35.35	4.20	0.00	.29051E+05
2290.26	12.77	4.20	562.1	0.178E+00	4.20	35.69	4.20	0.00	.30898E+05

```
  2428.78    12.77     4.20    567.4 0.176E+00    4.20      36.02     4.20     0.00    .32745E+05
  2567.30    12.77     4.20    572.5 0.175E+00    4.20      36.34     4.20     0.00    .34591E+05
  2705.82    12.77     4.20    577.6 0.173E+00    4.20      36.67     4.20     0.00    .36438E+05
  2844.34    12.77     4.20    582.7 0.172E+00    4.20      36.99     4.20     0.00    .38285E+05
  2982.87    12.77     4.20    587.7 0.170E+00    4.20      37.31     4.20     0.00    .40131E+05
  3121.39    12.77     4.20    592.7 0.169E+00    4.20      37.62     4.20     0.00    .41978E+05
  3259.91    12.77     4.20    597.6 0.167E+00    4.20      37.94     4.20     0.00    .43824E+05
  3398.43    12.77     4.20    602.5 0.166E+00    4.20      38.25     4.20     0.00    .45671E+05
  3536.95    12.77     4.20    607.4 0.165E+00    4.20      38.56     4.20     0.00    .47518E+05
  3675.48    12.77     4.20    612.2 0.163E+00    4.20      38.86     4.20     0.00    .49364E+05
  3814.00    12.77     4.20    617.0 0.162E+00    4.20      39.17     4.20     0.00    .51211E+05
  3952.52    12.77     4.20    621.7 0.161E+00    4.20      39.47     4.20     0.00    .53058E+05
  4091.04    12.77     4.20    626.4 0.160E+00    4.20      39.77     4.20     0.00    .54904E+05
  4229.56    12.77     4.20    631.1 0.158E+00    4.20      40.06     4.20     0.00    .56751E+05
  4368.08    12.77     4.20    635.8 0.157E+00    4.20      40.36     4.20     0.00    .58597E+05
  4506.61    12.77     4.20    640.4 0.156E+00    4.20      40.65     4.20     0.00    .60444E+05
  4645.13    12.77     4.20    644.9 0.155E+00    4.20      40.94     4.20     0.00    .62291E+05
  4783.65    12.77     4.20    649.5 0.154E+00    4.20      41.23     4.20     0.00    .64137E+05
  4922.17    12.77     4.20    654.0 0.153E+00    4.20      41.52     4.20     0.00    .65984E+05
  5060.69    12.77     4.20    658.5 0.152E+00    4.20      41.80     4.20     0.00    .67831E+05
  5199.22    12.77     4.20    662.9 0.151E+00    4.20      42.08     4.20     0.00    .69677E+05
  5337.74    12.77     4.20    667.3 0.150E+00    4.20      42.36     4.20     0.00    .71524E+05
  5476.26    12.77     4.20    671.7 0.149E+00    4.20      42.64     4.20     0.00    .73370E+05
  5614.78    12.77     4.20    676.1 0.148E+00    4.20      42.92     4.20     0.00    .75217E+05
  5753.30    12.77     4.20    680.4 0.147E+00    4.20      43.19     4.20     0.00    .77064E+05
  5891.83    12.77     4.20    684.7 0.146E+00    4.20      43.47     4.20     0.00    .78910E+05
  6030.35    12.77     4.20    689.0 0.145E+00    4.20      43.74     4.20     0.00    .80757E+05
  6168.87    12.77     4.20    693.3 0.144E+00    4.20      44.01     4.20     0.00    .82604E+05
  6307.39    12.77     4.20    697.5 0.143E+00    4.20      44.28     4.20     0.00    .84450E+05
  6445.91    12.77     4.20    701.7 0.143E+00    4.20      44.54     4.20     0.00    .86297E+05
  6584.44    12.77     4.20    705.9 0.142E+00    4.20      44.81     4.20     0.00    .88143E+05
  6722.96    12.77     4.20    710.0 0.141E+00    4.20      45.07     4.20     0.00    .89990E+05
  6861.48    12.77     4.20    714.1 0.140E+00    4.20      45.33     4.20     0.00    .91837E+05
  7000.00    12.77     4.20    718.2 0.139E+00    4.20      45.59     4.20     0.00    .93683E+05
 Cumulative travel time =       93683.2578 sec  (   26.02 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario5
 FILE NAME:         E:\Projets\Nemaska\Scenarios\5\S5_Q62lps.prd
 Time stamp:        Tue Dec 16 09:31:38 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2940.00  QA    =    220.50  ICHREG= 1
 HA    =      4.20  HD    =      4.20
 UA    =      0.075 F     =      0.005 USTAR =0.1849E-02
 UW    =      3.300 UWSTAR=0.3742E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.7019

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    178.20  YB1   =    125.00  YB2   =    231.40
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.95
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    134.80  THETA =      0.00  SIGMA =      9.80  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.7019  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.12
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      4.26  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     21.93  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     21.93
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.20  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       178.20 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.571   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.20m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.48     0.26    0.38    59.2 0.169E+01   0.30    74.80 .18515E+02
```

2.96	0.51	0.51	83.3	0.120E+01	0.60	74.61	.41112E+02
4.43	0.77	0.65	101.7	0.983E+00	0.90	74.44	.64858E+02
5.91	1.02	0.78	117.3	0.852E+00	1.20	74.27	.89239E+02
7.39	1.28	0.91	131.1	0.763E+00	1.50	74.11	.11404E+03
8.87	1.53	1.04	143.5	0.697E+00	1.80	73.97	.13915E+03
10.35	1.79	1.17	154.9	0.646E+00	2.10	73.83	.16448E+03
11.82	2.04	1.31	165.5	0.604E+00	2.40	73.70	.19001E+03
13.30	2.30	1.44	175.5	0.570E+00	2.70	73.57	.21569E+03
14.78	2.55	1.57	184.9	0.541E+00	3.00	73.45	.24150E+03
16.26	2.81	1.70	193.9	0.516E+00	3.30	73.34	.26743E+03
17.74	3.06	1.84	202.5	0.494E+00	3.60	73.23	.29345E+03
19.22	3.32	1.97	210.7	0.475E+00	3.90	73.13	.31955E+03
20.69	3.57	2.10	218.6	0.457E+00	4.20	73.03	.34574E+03
22.17	3.83	2.10	226.3	0.442E+00	4.20	72.94	.37199E+03
23.65	4.09	2.10	233.7	0.428E+00	4.20	72.85	.39830E+03
25.13	4.34	2.10	240.8	0.415E+00	4.20	72.77	.42467E+03
26.61	4.60	2.10	247.8	0.404E+00	4.20	72.69	.45109E+03
28.08	4.85	2.10	254.5	0.393E+00	4.20	72.61	.47755E+03
29.56	5.11	2.10	261.1	0.383E+00	4.20	72.54	.50407E+03
31.04	5.36	2.10	267.5	0.374E+00	4.20	72.47	.53062E+03
32.52	5.62	2.10	273.8	0.365E+00	4.20	72.40	.55721E+03
34.00	5.87	2.10	279.9	0.357E+00	4.20	72.34	.58383E+03
35.47	6.13	2.10	285.9	0.350E+00	4.20	72.28	.61049E+03
36.95	6.38	2.10	291.8	0.343E+00	4.20	72.22	.63718E+03
38.43	6.64	2.10	297.6	0.336E+00	4.20	72.16	.66389E+03
39.91	6.89	2.10	303.2	0.330E+00	4.20	72.11	.69064E+03
41.39	7.15	2.10	308.8	0.324E+00	4.20	72.06	.71741E+03
42.87	7.40	2.10	308.8	0.324E+00	4.20	72.01	.74303E+03
44.34	7.66	2.10	308.8	0.324E+00	4.20	71.97	.76865E+03
45.82	7.91	2.10	308.8	0.324E+00	4.20	71.93	.79427E+03
47.30	8.17	2.10	308.8	0.324E+00	4.20	71.89	.81990E+03
48.78	8.43	2.10	308.8	0.324E+00	4.20	71.85	.84552E+03
50.26	8.68	2.10	308.8	0.324E+00	4.20	71.82	.87114E+03
51.73	8.94	2.10	308.8	0.324E+00	4.20	71.79	.89676E+03
53.21	9.19	2.10	308.8	0.324E+00	4.20	71.76	.92238E+03
54.69	9.45	2.10	308.8	0.324E+00	4.20	71.74	.94800E+03
56.17	9.70	2.10	308.8	0.324E+00	4.20	71.72	.97363E+03
57.65	9.96	2.10	308.8	0.324E+00	4.20	71.70	.99925E+03
59.12	10.21	2.10	308.8	0.324E+00	4.20	71.68	.10249E+04
60.60	10.47	2.10	308.8	0.324E+00	4.20	71.66	.10505E+04
62.08	10.72	2.10	308.8	0.324E+00	4.20	71.65	.10761E+04
63.56	10.98	2.10	308.8	0.324E+00	4.20	71.64	.11017E+04
65.04	11.23	2.10	308.8	0.324E+00	4.20	71.63	.11274E+04
66.52	11.49	2.10	308.8	0.324E+00	4.20	71.62	.11530E+04
67.99	11.74	2.10	308.8	0.324E+00	4.20	71.61	.11786E+04
69.47	12.00	2.10	308.8	0.324E+00	4.20	71.61	.12042E+04
70.95	12.26	2.10	308.8	0.324E+00	4.20	71.60	.12298E+04
72.43	12.51	2.10	308.8	0.324E+00	4.20	71.60	.12555E+04
73.91	12.77	2.10	308.8	0.324E+00	4.20	71.60	.12811E+04

Cumulative travel time = 1281.0876 sec (0.36 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.327E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.408E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.91	12.77	4.20	308.8	0.324E+00	4.20	30.38	4.20	0.00	.12811E+04
212.43	12.77	4.20	312.7	0.320E+00	4.20	30.77	4.20	0.00	.31275E+04
350.95	12.77	4.20	316.6	0.316E+00	4.20	31.15	4.20	0.00	.49740E+04
489.47	12.77	4.20	320.4	0.312E+00	4.20	31.53	4.20	0.00	.68204E+04
627.99	12.77	4.20	324.2	0.308E+00	4.20	31.90	4.20	0.00	.86668E+04
766.52	12.77	4.20	328.0	0.305E+00	4.20	32.27	4.20	0.00	.10513E+05
905.04	12.77	4.20	331.7	0.301E+00	4.20	32.63	4.20	0.00	.12360E+05
1043.56	12.77	4.20	335.4	0.298E+00	4.20	32.99	4.20	0.00	.14206E+05
1182.08	12.77	4.20	339.0	0.295E+00	4.20	33.35	4.20	0.00	.16053E+05
1320.60	12.77	4.20	342.6	0.292E+00	4.20	33.71	4.20	0.00	.17899E+05
1459.12	12.77	4.20	346.1	0.289E+00	4.20	34.05	4.20	0.00	.19745E+05
1597.65	12.77	4.20	349.7	0.286E+00	4.20	34.40	4.20	0.00	.21592E+05
1736.17	12.77	4.20	353.1	0.283E+00	4.20	34.74	4.20	0.00	.23438E+05
1874.69	12.77	4.20	356.6	0.280E+00	4.20	35.08	4.20	0.00	.25285E+05
2013.21	12.77	4.20	360.0	0.278E+00	4.20	35.42	4.20	0.00	.27131E+05
2151.73	12.77	4.20	363.4	0.275E+00	4.20	35.75	4.20	0.00	.28978E+05
2290.26	12.77	4.20	366.7	0.273E+00	4.20	36.08	4.20	0.00	.30824E+05

```
   2428.78     12.77     4.20    370.1 0.270E+00    4.20      36.41     4.20     0.00    .32671E+05
   2567.30     12.77     4.20    373.3 0.268E+00    4.20      36.73     4.20     0.00    .34517E+05
   2705.82     12.77     4.20    376.6 0.266E+00    4.20      37.05     4.20     0.00    .36363E+05
   2844.34     12.77     4.20    379.8 0.263E+00    4.20      37.37     4.20     0.00    .38210E+05
   2982.87     12.77     4.20    383.0 0.261E+00    4.20      37.69     4.20     0.00    .40056E+05
   3121.39     12.77     4.20    386.2 0.259E+00    4.20      38.00     4.20     0.00    .41903E+05
   3259.91     12.77     4.20    389.4 0.257E+00    4.20      38.31     4.20     0.00    .43749E+05
   3398.43     12.77     4.20    392.5 0.255E+00    4.20      38.62     4.20     0.00    .45596E+05
   3536.95     12.77     4.20    395.6 0.253E+00    4.20      38.92     4.20     0.00    .47442E+05
   3675.48     12.77     4.20    398.7 0.251E+00    4.20      39.23     4.20     0.00    .49289E+05
   3814.00     12.77     4.20    401.8 0.249E+00    4.20      39.53     4.20     0.00    .51135E+05
   3952.52     12.77     4.20    404.8 0.247E+00    4.20      39.83     4.20     0.00    .52981E+05
   4091.04     12.77     4.20    407.8 0.245E+00    4.20      40.12     4.20     0.00    .54828E+05
   4229.56     12.77     4.20    410.8 0.243E+00    4.20      40.42     4.20     0.00    .56674E+05
   4368.08     12.77     4.20    413.8 0.242E+00    4.20      40.71     4.20     0.00    .58521E+05
   4506.61     12.77     4.20    416.7 0.240E+00    4.20      41.00     4.20     0.00    .60367E+05
   4645.13     12.77     4.20    419.6 0.238E+00    4.20      41.29     4.20     0.00    .62214E+05
   4783.65     12.77     4.20    422.5 0.237E+00    4.20      41.57     4.20     0.00    .64060E+05
   4922.17     12.77     4.20    425.4 0.235E+00    4.20      41.86     4.20     0.00    .65906E+05
   5060.69     12.77     4.20    428.3 0.233E+00    4.20      42.14     4.20     0.00    .67753E+05
   5199.22     12.77     4.20    431.1 0.232E+00    4.20      42.42     4.20     0.00    .69599E+05
   5337.74     12.77     4.20    434.0 0.230E+00    4.20      42.70     4.20     0.00    .71446E+05
   5476.26     12.77     4.20    436.8 0.229E+00    4.20      42.97     4.20     0.00    .73292E+05
   5614.78     12.77     4.20    439.6 0.227E+00    4.20      43.25     4.20     0.00    .75139E+05
   5753.30     12.77     4.20    442.3 0.226E+00    4.20      43.52     4.20     0.00    .76985E+05
   5891.83     12.77     4.20    445.1 0.225E+00    4.20      43.79     4.20     0.00    .78832E+05
   6030.35     12.77     4.20    447.8 0.223E+00    4.20      44.06     4.20     0.00    .80678E+05
   6168.87     12.77     4.20    450.6 0.222E+00    4.20      44.33     4.20     0.00    .82524E+05
   6307.39     12.77     4.20    453.3 0.221E+00    4.20      44.59     4.20     0.00    .84371E+05
   6445.91     12.77     4.20    456.0 0.219E+00    4.20      44.86     4.20     0.00    .86217E+05
   6584.44     12.77     4.20    458.6 0.218E+00    4.20      45.12     4.20     0.00    .88064E+05
   6722.96     12.77     4.20    461.3 0.217E+00    4.20      45.38     4.20     0.00    .89910E+05
   6861.48     12.77     4.20    463.9 0.216E+00    4.20      45.64     4.20     0.00    .91757E+05
   7000.00     12.77     4.20    466.6 0.214E+00    4.20      45.90     4.20     0.00    .93603E+05
 Cumulative travel time =        93603.0547 sec  (   26.00 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX

SESSION REPORT

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CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario1
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\1\S1 Q22lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:04:50
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 403.20 m^3/s
  Average depth                   HA    = 4.8 m
  Depth at discharge              HD    = 4.8 m
  Ambient velocity                UA    = 0.12 m/s
  Darcy-Weisbach friction factor  F     = 0.0047
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 2.5 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 6 degC
  Bottom temperature                    = 6 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.9430 kg/m^3
  Bottom density                  RHOAB  = 999.9430 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 241.70 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 0.58 m/s
  Total discharge flowrate        Q0    = 0.022 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 128.90 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 3.9 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 6 degC
  Corresponding density           RHO0   = 999.9430 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
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```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000147 m^2/s
  Momentum flux                   m0     = 0.000086 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.01 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 4.86
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.8 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    183.35 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.0588 %
  Dilution at edge of NFR              s = 1699.7
  NFR Location:                        x = 74.83 m
    (centerline coordinates)           y = 5.10 m
                                       z = 4.8 m
  NFR plume dimensions:  half-width (bh) = 74.86 m
                          thickness (bv) = 4.8 m
Cumulative travel time:       800.1493 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
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  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.83 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario1
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\1\S1 Q40lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:06:23
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 403.20 m^3/s
  Average depth                   HA    = 4.8 m
  Depth at discharge              HD    = 4.8 m
  Ambient velocity                UA    = 0.12 m/s
  Darcy-Weisbach friction factor  F     = 0.0047
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 2.5 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 6 degC
  Bottom temperature                    = 6 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.9430 kg/m^3
  Bottom density                  RHOAB  = 999.9430 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 241.70 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.06 m/s
  Total discharge flowrate        Q0    = 0.04 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 128.90 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 3.9 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 6 degC
  Corresponding density           RHO0   = 999.9430 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000267 m^2/s
  Momentum flux                   m0     = 0.000283 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.02 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 8.84
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.8 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    183.35 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1067 %
  Dilution at edge of NFR              s = 937.0
  NFR Location:                        x = 74.83 m
    (centerline coordinates)           y = 5.10 m
                                       z = 4.8 m
  NFR plume dimensions:  half-width (bh) = 74.55 m
                          thickness (bv) = 4.8 m
Cumulative travel time:       793.4702 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.83 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario1
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\1\S1 Q62lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:06:35
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 403.20 m^3/s
  Average depth                   HA    = 4.8 m
  Depth at discharge              HD    = 4.8 m
  Ambient velocity                UA    = 0.12 m/s
  Darcy-Weisbach friction factor  F     = 0.0047
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 2.5 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 6 degC
  Bottom temperature                    = 6 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.9430 kg/m^3
  Bottom density                  RHOAB  = 999.9430 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 241.70 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.64 m/s
  Total discharge flowrate        Q0    = 0.062 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 128.90 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 3.9 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 6 degC
  Corresponding density           RHO0   = 999.9430 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000413 m^2/s
  Momentum flux                   m0     = 0.000680 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.05 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 13.71
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.8 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    183.35 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1646 %
  Dilution at edge of NFR              s = 607.4
  NFR Location:                        x = 74.83 m
    (centerline coordinates)           y = 5.10 m
                                       z = 4.8 m
  NFR plume dimensions:  half-width (bh) = 73.95 m
                          thickness (bv) = 4.8 m
Cumulative travel time:       780.4619 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.83 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario2
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\2\S2 Q22lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:08:24
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 357.42 m^3/s
  Average depth                   HA    = 4.6 m
  Depth at discharge              HD    = 4.6 m
  Ambient velocity                UA    = 0.111 m/s
  Darcy-Weisbach friction factor  F     = 0.0047
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 1.8 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 14 degC
  Bottom temperature                    = 14 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.2460 kg/m^3
  Bottom density                  RHOAB  = 999.2460 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 239.60 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 0.58 m/s
  Total discharge flowrate        Q0    = 0.022 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 130.20 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 5.2 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 14 degC
  Corresponding density           RHO0   = 999.2460 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000147 m^2/s
  Momentum flux                   m0     = 0.000086 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.01 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 5.26
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.6 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    182.30 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.0676 %
  Dilution at edge of NFR              s = 1479.2
  NFR Location:                        x = 74.69 m
    (centerline coordinates)           y = 6.80 m
                                       z = 4.6 m
  NFR plume dimensions:  half-width (bh) = 74.83 m
                          thickness (bv) = 4.6 m
Cumulative travel time:       880.5309 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.69 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario2
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\2\S2 Q40lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:08:38
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 357.42 m^3/s
  Average depth                   HA    = 4.6 m
  Depth at discharge              HD    = 4.6 m
  Ambient velocity                UA    = 0.111 m/s
  Darcy-Weisbach friction factor  F     = 0.0047
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 1.8 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 14 degC
  Bottom temperature                    = 14 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.2460 kg/m^3
  Bottom density                  RHOAB  = 999.2460 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 239.60 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.06 m/s
  Total discharge flowrate        Q0    = 0.04 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 130.20 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 5.2 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 14 degC
  Corresponding density           RHO0   = 999.2460 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000267 m^2/s
  Momentum flux                   m0     = 0.000283 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.02 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 9.56
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.6 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    182.30 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1226 %
  Dilution at edge of NFR              s = 815.9
  NFR Location:                        x = 74.69 m
    (centerline coordinates)           y = 6.80 m
                                       z = 4.6 m
  NFR plume dimensions:  half-width (bh) = 74.43 m
                          thickness (bv) = 4.6 m
Cumulative travel time:       871.2651 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.69 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario2
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\2\S2 Q62lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:08:51
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 357.42 m^3/s
  Average depth                   HA    = 4.6 m
  Depth at discharge              HD    = 4.6 m
  Ambient velocity                UA    = 0.111 m/s
  Darcy-Weisbach friction factor  F     = 0.0047
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 1.8 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 14 degC
  Bottom temperature                    = 14 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.2460 kg/m^3
  Bottom density                  RHOAB  = 999.2460 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 239.60 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.64 m/s
  Total discharge flowrate        Q0    = 0.062 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 130.20 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 5.2 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 14 degC
  Corresponding density           RHO0   = 999.2460 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000413 m^2/s
  Momentum flux                   m0     = 0.000680 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.06 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 14.82
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.6 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    182.30 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1889 %
  Dilution at edge of NFR              s = 529.5
  NFR Location:                        x = 74.69 m
    (centerline coordinates)           y = 6.80 m
                                       z = 4.6 m
  NFR plume dimensions:  half-width (bh) = 73.68 m
                          thickness (bv) = 4.6 m
Cumulative travel time:       853.3666 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.69 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario3
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\3\S3 Q22lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:10:55
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 306.64 m^3/s
  Average depth                   HA    = 4.47 m
  Depth at discharge              HD    = 4.47 m
  Ambient velocity                UA    = 0.098 m/s
  Darcy-Weisbach friction factor  F     = 0.0048
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 3.2 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 16 degC
  Bottom temperature                    = 16 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 998.9443 kg/m^3
  Bottom density                  RHOAB  = 998.9443 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 236.5 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 0.58 m/s
  Total discharge flowrate        Q0    = 0.022 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 132 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 7 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 16 degC
  Corresponding density           RHO0   = 998.9443 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000147 m^2/s
  Momentum flux                   m0     = 0.000086 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.01 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 5.95
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.47 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    180.75 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.0809 %
  Dilution at edge of NFR              s = 1235.3
  NFR Location:                        x = 74.44 m
    (centerline coordinates)           y = 9.14 m
                                       z = 4.47 m
  NFR plume dimensions:  half-width (bh) = 74.76 m
                          thickness (bv) = 4.47 m
Cumulative travel time:       1023.1842 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.44 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario3
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\3\S3 Q40lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:11:09
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 306.64 m^3/s
  Average depth                   HA    = 4.47 m
  Depth at discharge              HD    = 4.47 m
  Ambient velocity                UA    = 0.098 m/s
  Darcy-Weisbach friction factor  F     = 0.0048
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 3.2 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 16 degC
  Bottom temperature                    = 16 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 998.9443 kg/m^3
  Bottom density                  RHOAB  = 998.9443 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 236.5 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.06 m/s
  Total discharge flowrate        Q0    = 0.04 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 132 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 7 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 16 degC
  Corresponding density           RHO0   = 998.9443 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000267 m^2/s
  Momentum flux                   m0     = 0.000283 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.03 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 10.83
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.47 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    180.75 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1466 %
  Dilution at edge of NFR              s = 682.2
  NFR Location:                        x = 74.44 m
    (centerline coordinates)           y = 9.14 m
                                       z = 4.47 m
  NFR plume dimensions:  half-width (bh) = 74.22 m
                          thickness (bv) = 4.47 m
Cumulative travel time:       1008.2893 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.44 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario3
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\3\S3 Q62lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:11:28
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 306.64 m^3/s
  Average depth                   HA    = 4.47 m
  Depth at discharge              HD    = 4.47 m
  Ambient velocity                UA    = 0.098 m/s
  Darcy-Weisbach friction factor  F     = 0.0048
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 3.2 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 16 degC
  Bottom temperature                    = 16 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 998.9443 kg/m^3
  Bottom density                  RHOAB  = 998.9443 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 236.5 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.64 m/s
  Total discharge flowrate        Q0    = 0.062 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 132 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 7 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 16 degC
  Corresponding density           RHO0   = 998.9443 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000413 m^2/s
  Momentum flux                   m0     = 0.000680 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.07 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 16.78
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.47 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    180.75 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.2254 %
  Dilution at edge of NFR              s = 443.7
  NFR Location:                        x = 74.44 m
    (centerline coordinates)           y = 9.14 m
                                       z = 4.47 m
  NFR plume dimensions:  half-width (bh) = 73.19 m
                          thickness (bv) = 4.47 m
Cumulative travel time:       979.9515 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
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  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 74.44 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario4
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\4\S4 Q22lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:14:36
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 131.60 m^3/s
  Average depth                   HA    = 4 m
  Depth at discharge              HD    = 4 m
  Ambient velocity                UA    = 0.047 m/s
  Darcy-Weisbach friction factor  F     = 0.0049
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 1.6 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 15 degC
  Bottom temperature                    = 15 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.1011 kg/m^3
  Bottom density                  RHOAB  = 999.1011 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional parallel
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 230 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 0.58 m/s
  Total discharge flowrate        Q0    = 0.022 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 135.57 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 10.57 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 15 degC
  Corresponding density           RHO0   = 999.1011 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000147 m^2/s
  Momentum flux                   m0     = 0.000086 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.04 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 12.42
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU4 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    177.5 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.2032 %
  Dilution at edge of NFR              s = 492.2
  NFR Location:                        x = 73.56 m
    (centerline coordinates)           y = 0.13 m
                                       z = 4 m
  NFR plume dimensions:  half-width (bh) = 28.80 m
                          thickness (bv) = 4 m
Cumulative travel time:       1565.0640 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 73.56 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario4
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\4\S4 Q40lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:14:50
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 131.60 m^3/s
  Average depth                   HA    = 4 m
  Depth at discharge              HD    = 4 m
  Ambient velocity                UA    = 0.047 m/s
  Darcy-Weisbach friction factor  F     = 0.0049
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 1.6 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 15 degC
  Bottom temperature                    = 15 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.1011 kg/m^3
  Bottom density                  RHOAB  = 999.1011 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional parallel
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 230 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.06 m/s
  Total discharge flowrate        Q0    = 0.04 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 135.57 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 10.57 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 15 degC
  Corresponding density           RHO0   = 999.1011 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000267 m^2/s
  Momentum flux                   m0     = 0.000283 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.13 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 22.58
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU4 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    177.5 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.3615 %
  Dilution at edge of NFR              s = 276.6
  NFR Location:                        x = 73.56 m
    (centerline coordinates)           y = 0.44 m
                                       z = 4 m
  NFR plume dimensions:  half-width (bh) = 29.43 m
                          thickness (bv) = 4 m
Cumulative travel time:       1565.0640 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 73.56 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario4
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\4\S4 Q62lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:15:06
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 131.60 m^3/s
  Average depth                   HA    = 4 m
  Depth at discharge              HD    = 4 m
  Ambient velocity                UA    = 0.047 m/s
  Darcy-Weisbach friction factor  F     = 0.0049
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 1.6 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 15 degC
  Bottom temperature                    = 15 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.1011 kg/m^3
  Bottom density                  RHOAB  = 999.1011 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional parallel
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 230 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.64 m/s
  Total discharge flowrate        Q0    = 0.062 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 135.57 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 10.57 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 15 degC
  Corresponding density           RHO0   = 999.1011 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000413 m^2/s
  Momentum flux                   m0     = 0.000680 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.31 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 34.99
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU4 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    177.5 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.5387 %
  Dilution at edge of NFR              s = 185.6
  NFR Location:                        x = 73.56 m
    (centerline coordinates)           y = 1.06 m
                                       z = 4 m
  NFR plume dimensions:  half-width (bh) = 30.61 m
                          thickness (bv) = 4 m
Cumulative travel time:       1565.0640 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 73.56 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario5
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\5\S5 Q22lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:16:15
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 220.5 m^3/s
  Average depth                   HA    = 4.2 m
  Depth at discharge              HD    = 4.2 m
  Ambient velocity                UA    = 0.075 m/s
  Darcy-Weisbach friction factor  F     = 0.0049
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 3.3 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 10 degC
  Bottom temperature                    = 10 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.7019 kg/m^3
  Bottom density                  RHOAB  = 999.7019 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 231.40 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 0.58 m/s
  Total discharge flowrate        Q0    = 0.022 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 134.80 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 9.80 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 10 degC
  Corresponding density           RHO0   = 999.7019 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000147 m^2/s
  Momentum flux                   m0     = 0.000086 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.02 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 7.78
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.2 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    178.20 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1177 %
  Dilution at edge of NFR              s = 849.7
  NFR Location:                        x = 73.91 m
    (centerline coordinates)           y = 12.77 m
                                       z = 4.2 m
  NFR plume dimensions:  half-width (bh) = 74.52 m
                          thickness (bv) = 4.2 m
Cumulative travel time:       1391.3468 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 73.91 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario5
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\5\S5 Q40lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:16:27
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 220.5 m^3/s
  Average depth                   HA    = 4.2 m
  Depth at discharge              HD    = 4.2 m
  Ambient velocity                UA    = 0.075 m/s
  Darcy-Weisbach friction factor  F     = 0.0049
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 3.3 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 10 degC
  Bottom temperature                    = 10 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.7019 kg/m^3
  Bottom density                  RHOAB  = 999.7019 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 231.40 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.06 m/s
  Total discharge flowrate        Q0    = 0.04 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 134.80 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 9.80 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 10 degC
  Corresponding density           RHO0   = 999.7019 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000267 m^2/s
  Momentum flux                   m0     = 0.000283 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.05 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 14.15
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.2 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    178.20 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.2123 %
  Dilution at edge of NFR              s = 471.1
  NFR Location:                        x = 73.91 m
    (centerline coordinates)           y = 12.77 m
                                       z = 4.2 m
  NFR plume dimensions:  half-width (bh) = 73.48 m
                          thickness (bv) = 4.2 m
Cumulative travel time:       1352.0846 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 73.91 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                        CORMIX MIXING ZONE EXPERT SYSTEM
                            CORMIX Version 8.0GT
                         HYDRO2:Version-8.0.0.0  April,2012
SITE NAME/LABEL:                Lac des Montagnes
  DESIGN CASE:                  Scenario5
  FILE NAME:                    E:\Projets\Nemaska\Scenarios\5\S5 Q62lps.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             12/18/2014--14:16:37
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                           BS    = 700 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA    = 220.5 m^3/s
  Average depth                   HA    = 4.2 m
  Depth at discharge              HD    = 4.2 m
  Ambient velocity                UA    = 0.075 m/s
  Darcy-Weisbach friction factor  F     = 0.0049
    Calculated from Manning's n         = 0.01
  Wind velocity                   UW    = 3.3 m/s
  Stratification Type             STRCND = U
  Surface temperature                   = 10 degC
  Bottom temperature                    = 10 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS  = 999.7019 kg/m^3
  Bottom density                  RHOAB  = 999.7019 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD    = 150 m
  Nearest bank                          = right
  Diffuser endpoints              YB1   = 125 m;    YB2 = 231.40 m
  Number of openings              NOPEN  = 30
  Number of Risers                NRISER = 30
  Ports/Nozzles per Riser         NPPERR  = 1
  Spacing between risers/openings SPAC   = 5.17 m
  Port/Nozzle diameter            D0    = 0.04 m
    with contraction ratio              = 1
  Equivalent slot width           B0    = 0.0003 m
  Total area of openings          TA0   = 0.0377 m^2
  Discharge velocity              U0    = 1.64 m/s
  Total discharge flowrate        Q0    = 0.062 m^3/s
  Discharge port height           H0    = 0.25 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA  = 134.80 deg
  Vertical discharge angle        THETA  = 0 deg
  Actual Vertical discharge angle THEAC  = 0 deg
  Horizontal discharge angle      SIGMA  = 9.80 deg
  Relative orientation angle      BETA   = 55 deg
  Discharge temperature (freshwater)     = 10 degC
  Corresponding density           RHO0   = 999.7019 kg/m^3
  Density difference              DRHO   = 0 kg/m^3
  Buoyant acceleration            GP0    = 0 m/s^2
```

```
  Discharge concentration         C0     = 100 %
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.000413 m^2/s
  Momentum flux                   m0     = 0.000680 m^3/s^2
  Buoyancy flux                   j0     = 0 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.00 m         Lm  = 0.12 m         LM  = 99999 m
  lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 99999
  Port/nozzle Froude number       FRD0   = 99999
  Velocity ratio                  R      = 21.93
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 7000 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 4.2 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    178.20 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.3239 %
  Dilution at edge of NFR              s = 308.8
  NFR Location:                        x = 73.91 m
    (centerline coordinates)           y = 12.77 m
                                       z = 4.2 m
  NFR plume dimensions:  half-width (bh) = 71.60 m
                          thickness (bv) = 4.2 m
Cumulative travel time:       1281.0876 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is equal or about about equal to the surrounding
```

```
  ambient water density at the discharge level.
  Therefore, the effluent behaves essentially as NEUTRALLY BUOYANT.
-------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed ALREADY IN NEAR-FIELD at 73.91 m
  downstream and continues as vertically mixed into the far-field.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

CORMIX

PREDICTION FILE

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario1
 FILE NAME:         E:\Projets\Nemaska\Scenarios\1\S1_Q22lps.prd
 Time stamp:        Tue Dec 16 09:21:24 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3360.00  QA    =    403.20  ICHREG= 1
 HA    =      4.80  HD    =      4.80
 UA    =      0.120 F     =      0.005 USTAR =0.2894E-02
 UW    =      2.500 UWSTAR=0.2781E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.9430

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    183.35  YB1   =    125.00  YB2   =    241.70
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.55
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    128.90  THETA =      0.00  SIGMA =      3.90  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.9430  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.01
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      0.94  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      4.86  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      4.86
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 2222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.80  2
 2222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       183.35 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.464   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.50     0.10    0.38   301.3 0.332E+00   0.30    74.99 .15735E+02
```

2.99	0.20	0.52	425.7	0.235E+00	0.60	74.98	.31659E+02
4.49	0.31	0.65	521.1	0.192E+00	0.90	74.98	.47615E+02
5.99	0.41	0.79	601.6	0.166E+00	1.20	74.97	.63587E+02
7.48	0.51	0.92	672.5	0.149E+00	1.50	74.96	.79570E+02
8.98	0.61	1.06	736.6	0.136E+00	1.80	74.96	.95560E+02
10.48	0.71	1.19	795.5	0.126E+00	2.10	74.95	.11156E+03
11.97	0.82	1.33	850.4	0.118E+00	2.40	74.95	.12756E+03
13.47	0.92	1.46	901.9	0.111E+00	2.70	74.94	.14356E+03
14.97	1.02	1.59	950.6	0.105E+00	3.00	74.94	.15957E+03
16.46	1.12	1.73	997.0	0.100E+00	3.30	74.93	.17558E+03
17.96	1.22	1.86	1041.2	0.960E-01	3.60	74.93	.19159E+03
19.45	1.33	2.00	1083.7	0.923E-01	3.90	74.92	.20761E+03
20.95	1.43	2.13	1124.6	0.889E-01	4.20	74.92	.22362E+03
22.45	1.53	2.27	1164.0	0.859E-01	4.50	74.92	.23964E+03
23.94	1.63	2.40	1202.2	0.832E-01	4.80	74.91	.25566E+03
25.44	1.73	2.40	1239.1	0.807E-01	4.80	74.91	.27168E+03
26.94	1.84	2.40	1275.0	0.784E-01	4.80	74.91	.28770E+03
28.43	1.94	2.40	1310.0	0.763E-01	4.80	74.90	.30373E+03
29.93	2.04	2.40	1344.0	0.744E-01	4.80	74.90	.31975E+03
31.43	2.14	2.40	1377.1	0.726E-01	4.80	74.90	.33577E+03
32.92	2.24	2.40	1409.5	0.709E-01	4.80	74.90	.35180E+03
34.42	2.35	2.40	1441.2	0.694E-01	4.80	74.89	.36783E+03
35.92	2.45	2.40	1472.1	0.679E-01	4.80	74.89	.38385E+03
37.41	2.55	2.40	1502.5	0.666E-01	4.80	74.89	.39988E+03
38.91	2.65	2.40	1532.2	0.653E-01	4.80	74.89	.41591E+03
40.41	2.75	2.40	1561.4	0.640E-01	4.80	74.88	.43194E+03
41.90	2.86	2.40	1590.0	0.629E-01	4.80	74.88	.44797E+03
43.40	2.96	2.40	1618.1	0.618E-01	4.80	74.88	.46400E+03
44.90	3.06	2.40	1645.8	0.608E-01	4.80	74.88	.48003E+03
46.39	3.16	2.40	1673.0	0.598E-01	4.80	74.88	.49606E+03
47.89	3.26	2.40	1699.7	0.588E-01	4.80	74.87	.51210E+03
49.39	3.37	2.40	1699.7	0.588E-01	4.80	74.87	.52810E+03
50.88	3.47	2.40	1699.7	0.588E-01	4.80	74.87	.54410E+03
52.38	3.57	2.40	1699.7	0.588E-01	4.80	74.87	.56010E+03
53.87	3.67	2.40	1699.7	0.588E-01	4.80	74.87	.57611E+03
55.37	3.77	2.40	1699.7	0.588E-01	4.80	74.87	.59211E+03
56.87	3.88	2.40	1699.7	0.588E-01	4.80	74.87	.60811E+03
58.36	3.98	2.40	1699.7	0.588E-01	4.80	74.87	.62412E+03
59.86	4.08	2.40	1699.7	0.588E-01	4.80	74.87	.64012E+03
61.36	4.18	2.40	1699.7	0.588E-01	4.80	74.87	.65612E+03
62.85	4.28	2.40	1699.7	0.588E-01	4.80	74.87	.67213E+03
64.35	4.39	2.40	1699.7	0.588E-01	4.80	74.86	.68813E+03
65.85	4.49	2.40	1699.7	0.588E-01	4.80	74.86	.70413E+03
67.34	4.59	2.40	1699.7	0.588E-01	4.80	74.86	.72013E+03
68.84	4.69	2.40	1699.7	0.588E-01	4.80	74.86	.73614E+03
70.34	4.80	2.40	1699.7	0.588E-01	4.80	74.86	.75214E+03
71.83	4.90	2.40	1699.7	0.588E-01	4.80	74.86	.76814E+03
73.33	5.00	2.40	1699.7	0.588E-01	4.80	74.86	.78415E+03
74.83	5.10	2.40	1699.7	0.588E-01	4.80	74.86	.80015E+03

Cumulative travel time = 800.1493 sec (0.22 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.344E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.429E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.83	5.10	4.80	1699.7	0.588E-01	4.80	32.46	4.80	0.00	.80015E+03
213.33	5.10	4.80	1712.2	0.584E-01	4.80	32.70	4.80	0.00	.19543E+04
351.83	5.10	4.80	1724.7	0.580E-01	4.80	32.93	4.80	0.00	.31084E+04
490.34	5.10	4.80	1737.0	0.576E-01	4.80	33.17	4.80	0.00	.42625E+04
628.84	5.10	4.80	1749.2	0.572E-01	4.80	33.40	4.80	0.00	.54167E+04
767.34	5.10	4.80	1761.4	0.568E-01	4.80	33.64	4.80	0.00	.65708E+04
905.85	5.10	4.80	1773.5	0.564E-01	4.80	33.87	4.80	0.00	.77249E+04
1044.35	5.10	4.80	1785.5	0.560E-01	4.80	34.10	4.80	0.00	.88791E+04
1182.85	5.10	4.80	1797.4	0.556E-01	4.80	34.32	4.80	0.00	.10033E+05
1321.36	5.10	4.80	1809.2	0.553E-01	4.80	34.55	4.80	0.00	.11187E+05
1459.86	5.10	4.80	1821.0	0.549E-01	4.80	34.77	4.80	0.00	.12341E+05
1598.36	5.10	4.80	1832.7	0.546E-01	4.80	35.00	4.80	0.00	.13496E+05
1736.87	5.10	4.80	1844.3	0.542E-01	4.80	35.22	4.80	0.00	.14650E+05
1875.37	5.10	4.80	1855.8	0.539E-01	4.80	35.44	4.80	0.00	.15804E+05
2013.87	5.10	4.80	1867.3	0.536E-01	4.80	35.66	4.80	0.00	.16958E+05
2152.38	5.10	4.80	1878.7	0.532E-01	4.80	35.88	4.80	0.00	.18112E+05
2290.88	5.10	4.80	1890.0	0.529E-01	4.80	36.09	4.80	0.00	.19266E+05

2429.38	5.10	4.80	1901.3	0.526E-01	4.80	36.31	4.80	0.00	.20420E+05
2567.89	5.10	4.80	1912.5	0.523E-01	4.80	36.52	4.80	0.00	.21575E+05
2706.39	5.10	4.80	1923.6	0.520E-01	4.80	36.73	4.80	0.00	.22729E+05
2844.90	5.10	4.80	1934.7	0.517E-01	4.80	36.95	4.80	0.00	.23883E+05
2983.40	5.10	4.80	1945.7	0.514E-01	4.80	37.16	4.80	0.00	.25037E+05
3121.90	5.10	4.80	1956.6	0.511E-01	4.80	37.36	4.80	0.00	.26191E+05
3260.41	5.10	4.80	1967.5	0.508E-01	4.80	37.57	4.80	0.00	.27345E+05
3398.91	5.10	4.80	1978.3	0.505E-01	4.80	37.78	4.80	0.00	.28499E+05
3537.41	5.10	4.80	1989.1	0.503E-01	4.80	37.98	4.80	0.00	.29653E+05
3675.92	5.10	4.80	1999.8	0.500E-01	4.80	38.19	4.80	0.00	.30808E+05
3814.42	5.10	4.80	2010.4	0.497E-01	4.80	38.39	4.80	0.00	.31962E+05
3952.92	5.10	4.80	2021.0	0.495E-01	4.80	38.59	4.80	0.00	.33116E+05
4091.43	5.10	4.80	2031.6	0.492E-01	4.80	38.80	4.80	0.00	.34270E+05
4229.93	5.10	4.80	2042.1	0.490E-01	4.80	39.00	4.80	0.00	.35424E+05
4368.43	5.10	4.80	2052.5	0.487E-01	4.80	39.19	4.80	0.00	.36578E+05
4506.94	5.10	4.80	2062.9	0.485E-01	4.80	39.39	4.80	0.00	.37732E+05
4645.44	5.10	4.80	2073.2	0.482E-01	4.80	39.59	4.80	0.00	.38887E+05
4783.94	5.10	4.80	2083.5	0.480E-01	4.80	39.79	4.80	0.00	.40041E+05
4922.45	5.10	4.80	2093.7	0.478E-01	4.80	39.98	4.80	0.00	.41195E+05
5060.95	5.10	4.80	2103.8	0.475E-01	4.80	40.18	4.80	0.00	.42349E+05
5199.45	5.10	4.80	2114.0	0.473E-01	4.80	40.37	4.80	0.00	.43503E+05
5337.96	5.10	4.80	2124.0	0.471E-01	4.80	40.56	4.80	0.00	.44657E+05
5476.46	5.10	4.80	2134.1	0.469E-01	4.80	40.75	4.80	0.00	.45811E+05
5614.96	5.10	4.80	2144.1	0.466E-01	4.80	40.94	4.80	0.00	.46965E+05
5753.47	5.10	4.80	2154.0	0.464E-01	4.80	41.13	4.80	0.00	.48120E+05
5891.97	5.10	4.80	2163.9	0.462E-01	4.80	41.32	4.80	0.00	.49274E+05
6030.47	5.10	4.80	2173.7	0.460E-01	4.80	41.51	4.80	0.00	.50428E+05
6168.98	5.10	4.80	2183.5	0.458E-01	4.80	41.70	4.80	0.00	.51582E+05
6307.48	5.10	4.80	2193.3	0.456E-01	4.80	41.88	4.80	0.00	.52736E+05
6445.98	5.10	4.80	2203.0	0.454E-01	4.80	42.07	4.80	0.00	.53890E+05
6584.49	5.10	4.80	2212.7	0.452E-01	4.80	42.25	4.80	0.00	.55044E+05
6722.99	5.10	4.80	2222.3	0.450E-01	4.80	42.44	4.80	0.00	.56198E+05
6861.49	5.10	4.80	2231.9	0.448E-01	4.80	42.62	4.80	0.00	.57353E+05
7000.00	5.10	4.80	2241.4	0.446E-01	4.80	42.80	4.80	0.00	.58507E+05

Cumulative travel time = 58506.7812 sec (16.25 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario1
 FILE NAME:         E:\Projets\Nemaska\Scenarios\1\S1_Q40lps.prd
 Time stamp:        Tue Dec 16 09:22:31 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3360.00  QA    =    403.20  ICHREG= 1
 HA    =      4.80  HD    =      4.80
 UA    =      0.120 F     =      0.005 USTAR =0.2894E-02
 UW    =      2.500 UWSTAR=0.2781E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.9430

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    183.35  YB1   =    125.00  YB2   =    241.70
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.55
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    128.90  THETA =      0.00  SIGMA =      3.90  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.9430  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.72  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      8.84  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      8.84
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.80  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       183.35 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
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BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.941   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.50     0.10    0.38   166.5 0.601E+00   0.30    74.97 .15036E+02
```

2.99	0.20	0.52	235.0	0.426E+00	0.60	74.95	.30642E+02
4.49	0.31	0.65	287.6	0.348E+00	0.90	74.93	.46354E+02
5.99	0.41	0.79	331.9	0.301E+00	1.20	74.90	.62121E+02
7.48	0.51	0.92	371.0	0.270E+00	1.50	74.88	.77923E+02
8.98	0.61	1.06	406.3	0.246E+00	1.80	74.86	.93749E+02
10.48	0.71	1.19	438.8	0.228E+00	2.10	74.85	.10960E+03
11.97	0.82	1.33	469.0	0.213E+00	2.40	74.83	.12546E+03
13.47	0.92	1.46	497.4	0.201E+00	2.70	74.81	.14133E+03
14.97	1.02	1.59	524.3	0.191E+00	3.00	74.80	.15721E+03
16.46	1.12	1.73	549.8	0.182E+00	3.30	74.78	.17310E+03
17.96	1.22	1.86	574.2	0.174E+00	3.60	74.77	.18900E+03
19.45	1.33	2.00	597.6	0.167E+00	3.90	74.75	.20491E+03
20.95	1.43	2.13	620.1	0.161E+00	4.20	74.74	.22082E+03
22.45	1.53	2.27	641.9	0.156E+00	4.50	74.73	.23674E+03
23.94	1.63	2.40	662.9	0.151E+00	4.80	74.72	.25266E+03
25.44	1.73	2.40	683.2	0.146E+00	4.80	74.71	.26858E+03
26.94	1.84	2.40	703.0	0.142E+00	4.80	74.70	.28451E+03
28.43	1.94	2.40	722.3	0.138E+00	4.80	74.69	.30045E+03
29.93	2.04	2.40	741.0	0.135E+00	4.80	74.68	.31639E+03
31.43	2.14	2.40	759.3	0.132E+00	4.80	74.67	.33233E+03
32.92	2.24	2.40	777.1	0.129E+00	4.80	74.66	.34827E+03
34.42	2.35	2.40	794.6	0.126E+00	4.80	74.65	.36421E+03
35.92	2.45	2.40	811.6	0.123E+00	4.80	74.64	.38016E+03
37.41	2.55	2.40	828.3	0.121E+00	4.80	74.63	.39611E+03
38.91	2.65	2.40	844.7	0.118E+00	4.80	74.63	.41207E+03
40.41	2.75	2.40	860.8	0.116E+00	4.80	74.62	.42802E+03
41.90	2.86	2.40	876.6	0.114E+00	4.80	74.61	.44398E+03
43.40	2.96	2.40	892.1	0.112E+00	4.80	74.61	.45994E+03
44.90	3.06	2.40	907.3	0.110E+00	4.80	74.60	.47590E+03
46.39	3.16	2.40	922.3	0.108E+00	4.80	74.60	.49186E+03
47.89	3.26	2.40	937.0	0.107E+00	4.80	74.59	.50782E+03
49.39	3.37	2.40	937.0	0.107E+00	4.80	74.59	.52369E+03
50.88	3.47	2.40	937.0	0.107E+00	4.80	74.58	.53956E+03
52.38	3.57	2.40	937.0	0.107E+00	4.80	74.58	.55543E+03
53.87	3.67	2.40	937.0	0.107E+00	4.80	74.57	.57130E+03
55.37	3.77	2.40	937.0	0.107E+00	4.80	74.57	.58717E+03
56.87	3.88	2.40	937.0	0.107E+00	4.80	74.57	.60304E+03
58.36	3.98	2.40	937.0	0.107E+00	4.80	74.57	.61891E+03
59.86	4.08	2.40	937.0	0.107E+00	4.80	74.56	.63478E+03
61.36	4.18	2.40	937.0	0.107E+00	4.80	74.56	.65065E+03
62.85	4.28	2.40	937.0	0.107E+00	4.80	74.56	.66652E+03
64.35	4.39	2.40	937.0	0.107E+00	4.80	74.56	.68238E+03
65.85	4.49	2.40	937.0	0.107E+00	4.80	74.56	.69825E+03
67.34	4.59	2.40	937.0	0.107E+00	4.80	74.55	.71412E+03
68.84	4.69	2.40	937.0	0.107E+00	4.80	74.55	.72999E+03
70.34	4.80	2.40	937.0	0.107E+00	4.80	74.55	.74586E+03
71.83	4.90	2.40	937.0	0.107E+00	4.80	74.55	.76173E+03
73.33	5.00	2.40	937.0	0.107E+00	4.80	74.55	.77760E+03
74.83	5.10	2.40	937.0	0.107E+00	4.80	74.55	.79347E+03

Cumulative travel time = 793.4702 sec (0.22 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
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** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.344E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.429E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.83	5.10	4.80	937.0	0.107E+00	4.80	32.53	4.80	0.00	.79347E+03
213.33	5.10	4.80	943.9	0.106E+00	4.80	32.77	4.80	0.00	.19476E+04
351.83	5.10	4.80	950.7	0.105E+00	4.80	33.01	4.80	0.00	.31016E+04
490.34	5.10	4.80	957.5	0.104E+00	4.80	33.24	4.80	0.00	.42557E+04
628.84	5.10	4.80	964.2	0.104E+00	4.80	33.48	4.80	0.00	.54098E+04
767.34	5.10	4.80	970.9	0.103E+00	4.80	33.71	4.80	0.00	.65639E+04
905.85	5.10	4.80	977.5	0.102E+00	4.80	33.94	4.80	0.00	.77180E+04
1044.35	5.10	4.80	984.1	0.102E+00	4.80	34.17	4.80	0.00	.88720E+04
1182.85	5.10	4.80	990.6	0.101E+00	4.80	34.39	4.80	0.00	.10026E+05
1321.36	5.10	4.80	997.1	0.100E+00	4.80	34.62	4.80	0.00	.11180E+05
1459.86	5.10	4.80	1003.6	0.996E-01	4.80	34.84	4.80	0.00	.12334E+05
1598.36	5.10	4.80	1010.0	0.990E-01	4.80	35.07	4.80	0.00	.13488E+05
1736.87	5.10	4.80	1016.4	0.984E-01	4.80	35.29	4.80	0.00	.14642E+05
1875.37	5.10	4.80	1022.7	0.978E-01	4.80	35.51	4.80	0.00	.15797E+05
2013.87	5.10	4.80	1029.0	0.972E-01	4.80	35.73	4.80	0.00	.16951E+05
2152.38	5.10	4.80	1035.3	0.966E-01	4.80	35.94	4.80	0.00	.18105E+05
2290.88	5.10	4.80	1041.5	0.960E-01	4.80	36.16	4.80	0.00	.19259E+05

2429.38	5.10	4.80	1047.7	0.954E-01	4.80	36.37	4.80	0.00	.20413E+05
2567.89	5.10	4.80	1053.8	0.949E-01	4.80	36.59	4.80	0.00	.21567E+05
2706.39	5.10	4.80	1059.9	0.943E-01	4.80	36.80	4.80	0.00	.22721E+05
2844.90	5.10	4.80	1066.0	0.938E-01	4.80	37.01	4.80	0.00	.23875E+05
2983.40	5.10	4.80	1072.0	0.933E-01	4.80	37.22	4.80	0.00	.25029E+05
3121.90	5.10	4.80	1078.1	0.928E-01	4.80	37.43	4.80	0.00	.26183E+05
3260.41	5.10	4.80	1084.0	0.922E-01	4.80	37.64	4.80	0.00	.27337E+05
3398.91	5.10	4.80	1090.0	0.917E-01	4.80	37.84	4.80	0.00	.28491E+05
3537.41	5.10	4.80	1095.9	0.913E-01	4.80	38.05	4.80	0.00	.29645E+05
3675.92	5.10	4.80	1101.8	0.908E-01	4.80	38.25	4.80	0.00	.30800E+05
3814.42	5.10	4.80	1107.6	0.903E-01	4.80	38.45	4.80	0.00	.31954E+05
3952.92	5.10	4.80	1113.4	0.898E-01	4.80	38.66	4.80	0.00	.33108E+05
4091.43	5.10	4.80	1119.2	0.893E-01	4.80	38.86	4.80	0.00	.34262E+05
4229.93	5.10	4.80	1125.0	0.889E-01	4.80	39.06	4.80	0.00	.35416E+05
4368.43	5.10	4.80	1130.7	0.884E-01	4.80	39.26	4.80	0.00	.36570E+05
4506.94	5.10	4.80	1136.4	0.880E-01	4.80	39.45	4.80	0.00	.37724E+05
4645.44	5.10	4.80	1142.1	0.876E-01	4.80	39.65	4.80	0.00	.38878E+05
4783.94	5.10	4.80	1147.7	0.871E-01	4.80	39.85	4.80	0.00	.40032E+05
4922.45	5.10	4.80	1153.3	0.867E-01	4.80	40.04	4.80	0.00	.41186E+05
5060.95	5.10	4.80	1158.9	0.863E-01	4.80	40.24	4.80	0.00	.42340E+05
5199.45	5.10	4.80	1164.5	0.859E-01	4.80	40.43	4.80	0.00	.43494E+05
5337.96	5.10	4.80	1170.0	0.855E-01	4.80	40.62	4.80	0.00	.44649E+05
5476.46	5.10	4.80	1175.5	0.851E-01	4.80	40.81	4.80	0.00	.45803E+05
5614.96	5.10	4.80	1181.0	0.847E-01	4.80	41.00	4.80	0.00	.46957E+05
5753.47	5.10	4.80	1186.4	0.843E-01	4.80	41.19	4.80	0.00	.48111E+05
5891.97	5.10	4.80	1191.9	0.839E-01	4.80	41.38	4.80	0.00	.49265E+05
6030.47	5.10	4.80	1197.3	0.835E-01	4.80	41.57	4.80	0.00	.50419E+05
6168.98	5.10	4.80	1202.7	0.831E-01	4.80	41.75	4.80	0.00	.51573E+05
6307.48	5.10	4.80	1208.0	0.828E-01	4.80	41.94	4.80	0.00	.52727E+05
6445.98	5.10	4.80	1213.3	0.824E-01	4.80	42.13	4.80	0.00	.53881E+05
6584.49	5.10	4.80	1218.7	0.821E-01	4.80	42.31	4.80	0.00	.55035E+05
6722.99	5.10	4.80	1223.9	0.817E-01	4.80	42.49	4.80	0.00	.56189E+05
6861.49	5.10	4.80	1229.2	0.814E-01	4.80	42.68	4.80	0.00	.57343E+05
7000.00	5.10	4.80	1234.5	0.810E-01	4.80	42.86	4.80	0.00	.58498E+05

Cumulative travel time = 58497.5273 sec (16.25 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario1
 FILE NAME:         E:\Projets\Nemaska\Scenarios\1\S1_Q62lps.prd
 Time stamp:        Tue Dec 16 09:23:16 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3360.00  QA    =    403.20  ICHREG= 1
 HA    =      4.80  HD    =      4.80
 UA    =      0.120 F     =      0.005 USTAR =0.2894E-02
 UW    =      2.500 UWSTAR=0.2781E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.9430

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    183.35  YB1   =    125.00  YB2   =    241.70
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.55
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    128.90  THETA =      0.00  SIGMA =      3.90  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.9430  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.05
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.66  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     13.71  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     13.71
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.80  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       183.35 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.525   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.50     0.10    0.38   108.2 0.924E+00   0.30    74.94 .13813E+02
```

2.99	0.20	0.52	152.6	0.655E+00	0.60	74.88	.28800E+02
4.49	0.31	0.65	186.7	0.536E+00	0.90	74.83	.44031E+02
5.99	0.41	0.79	215.4	0.464E+00	1.20	74.77	.59391E+02
7.48	0.51	0.92	240.7	0.415E+00	1.50	74.73	.74834E+02
8.98	0.61	1.06	263.6	0.379E+00	1.80	74.68	.90335E+02
10.48	0.71	1.19	284.6	0.351E+00	2.10	74.64	.10588E+03
11.97	0.82	1.33	304.2	0.329E+00	2.40	74.60	.12146E+03
13.47	0.92	1.46	322.6	0.310E+00	2.70	74.56	.13707E+03
14.97	1.02	1.59	340.0	0.294E+00	3.00	74.52	.15271E+03
16.46	1.12	1.73	356.5	0.280E+00	3.30	74.49	.16836E+03
17.96	1.22	1.86	372.3	0.269E+00	3.60	74.45	.18404E+03
19.45	1.33	2.00	387.5	0.258E+00	3.90	74.42	.19973E+03
20.95	1.43	2.13	402.1	0.249E+00	4.20	74.39	.21543E+03
22.45	1.53	2.27	416.1	0.240E+00	4.50	74.36	.23115E+03
23.94	1.63	2.40	429.8	0.233E+00	4.80	74.34	.24687E+03
25.44	1.73	2.40	443.0	0.226E+00	4.80	74.31	.26261E+03
26.94	1.84	2.40	455.8	0.219E+00	4.80	74.28	.27836E+03
28.43	1.94	2.40	468.2	0.214E+00	4.80	74.26	.29411E+03
29.93	2.04	2.40	480.4	0.208E+00	4.80	74.24	.30988E+03
31.43	2.14	2.40	492.2	0.203E+00	4.80	74.22	.32565E+03
32.92	2.24	2.40	503.8	0.199E+00	4.80	74.20	.34142E+03
34.42	2.35	2.40	515.1	0.194E+00	4.80	74.18	.35721E+03
35.92	2.45	2.40	526.1	0.190E+00	4.80	74.16	.37300E+03
37.41	2.55	2.40	537.0	0.186E+00	4.80	74.14	.38879E+03
38.91	2.65	2.40	547.6	0.183E+00	4.80	74.12	.40460E+03
40.41	2.75	2.40	558.0	0.179E+00	4.80	74.11	.42040E+03
41.90	2.86	2.40	568.2	0.176E+00	4.80	74.09	.43621E+03
43.40	2.96	2.40	578.2	0.173E+00	4.80	74.08	.45203E+03
44.90	3.06	2.40	588.1	0.170E+00	4.80	74.06	.46785E+03
46.39	3.16	2.40	597.8	0.167E+00	4.80	74.05	.48367E+03
47.89	3.26	2.40	607.4	0.165E+00	4.80	74.04	.49950E+03
49.39	3.37	2.40	607.4	0.165E+00	4.80	74.03	.51510E+03
50.88	3.47	2.40	607.4	0.165E+00	4.80	74.02	.53071E+03
52.38	3.57	2.40	607.4	0.165E+00	4.80	74.01	.54632E+03
53.87	3.67	2.40	607.4	0.165E+00	4.80	74.00	.56193E+03
55.37	3.77	2.40	607.4	0.165E+00	4.80	73.99	.57754E+03
56.87	3.88	2.40	607.4	0.165E+00	4.80	73.98	.59315E+03
58.36	3.98	2.40	607.4	0.165E+00	4.80	73.98	.60876E+03
59.86	4.08	2.40	607.4	0.165E+00	4.80	73.97	.62437E+03
61.36	4.18	2.40	607.4	0.165E+00	4.80	73.97	.63998E+03
62.85	4.28	2.40	607.4	0.165E+00	4.80	73.96	.65559E+03
64.35	4.39	2.40	607.4	0.165E+00	4.80	73.96	.67120E+03
65.85	4.49	2.40	607.4	0.165E+00	4.80	73.96	.68681E+03
67.34	4.59	2.40	607.4	0.165E+00	4.80	73.95	.70242E+03
68.84	4.69	2.40	607.4	0.165E+00	4.80	73.95	.71802E+03
70.34	4.80	2.40	607.4	0.165E+00	4.80	73.95	.73363E+03
71.83	4.90	2.40	607.4	0.165E+00	4.80	73.95	.74924E+03
73.33	5.00	2.40	607.4	0.165E+00	4.80	73.95	.76485E+03
74.83	5.10	2.40	607.4	0.165E+00	4.80	73.95	.78046E+03

Cumulative travel time = 780.4619 sec (0.22 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
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** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.344E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.429E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.83	5.10	4.80	607.4	0.165E+00	4.80	32.68	4.80	0.00	.78046E+03
213.33	5.10	4.80	611.8	0.163E+00	4.80	32.92	4.80	0.00	.19345E+04
351.83	5.10	4.80	616.2	0.162E+00	4.80	33.16	4.80	0.00	.30885E+04
490.34	5.10	4.80	620.5	0.161E+00	4.80	33.39	4.80	0.00	.42425E+04
628.84	5.10	4.80	624.8	0.160E+00	4.80	33.62	4.80	0.00	.53965E+04
767.34	5.10	4.80	629.1	0.159E+00	4.80	33.85	4.80	0.00	.65506E+04
905.85	5.10	4.80	633.4	0.158E+00	4.80	34.08	4.80	0.00	.77046E+04
1044.35	5.10	4.80	637.6	0.157E+00	4.80	34.31	4.80	0.00	.88586E+04
1182.85	5.10	4.80	641.8	0.156E+00	4.80	34.54	4.80	0.00	.10013E+05
1321.36	5.10	4.80	646.0	0.155E+00	4.80	34.76	4.80	0.00	.11167E+05
1459.86	5.10	4.80	650.1	0.154E+00	4.80	34.98	4.80	0.00	.12321E+05
1598.36	5.10	4.80	654.2	0.153E+00	4.80	35.21	4.80	0.00	.13475E+05
1736.87	5.10	4.80	658.3	0.152E+00	4.80	35.43	4.80	0.00	.14629E+05
1875.37	5.10	4.80	662.4	0.151E+00	4.80	35.65	4.80	0.00	.15783E+05
2013.87	5.10	4.80	666.5	0.150E+00	4.80	35.86	4.80	0.00	.16937E+05
2152.38	5.10	4.80	670.5	0.149E+00	4.80	36.08	4.80	0.00	.18091E+05
2290.88	5.10	4.80	674.5	0.148E+00	4.80	36.29	4.80	0.00	.19245E+05

2429.38	5.10	4.80	678.4	0.147E+00	4.80	36.51	4.80	0.00	.20399E+05
2567.89	5.10	4.80	682.4	0.147E+00	4.80	36.72	4.80	0.00	.21553E+05
2706.39	5.10	4.80	686.3	0.146E+00	4.80	36.93	4.80	0.00	.22707E+05
2844.90	5.10	4.80	690.2	0.145E+00	4.80	37.14	4.80	0.00	.23861E+05
2983.40	5.10	4.80	694.1	0.144E+00	4.80	37.35	4.80	0.00	.25015E+05
3121.90	5.10	4.80	698.0	0.143E+00	4.80	37.56	4.80	0.00	.26169E+05
3260.41	5.10	4.80	701.8	0.142E+00	4.80	37.77	4.80	0.00	.27323E+05
3398.91	5.10	4.80	705.6	0.142E+00	4.80	37.97	4.80	0.00	.28477E+05
3537.41	5.10	4.80	709.4	0.141E+00	4.80	38.18	4.80	0.00	.29631E+05
3675.92	5.10	4.80	713.2	0.140E+00	4.80	38.38	4.80	0.00	.30785E+05
3814.42	5.10	4.80	717.0	0.139E+00	4.80	38.58	4.80	0.00	.31939E+05
3952.92	5.10	4.80	720.7	0.139E+00	4.80	38.78	4.80	0.00	.33093E+05
4091.43	5.10	4.80	724.4	0.138E+00	4.80	38.98	4.80	0.00	.34247E+05
4229.93	5.10	4.80	728.1	0.137E+00	4.80	39.18	4.80	0.00	.35401E+05
4368.43	5.10	4.80	731.8	0.137E+00	4.80	39.38	4.80	0.00	.36555E+05
4506.94	5.10	4.80	735.5	0.136E+00	4.80	39.58	4.80	0.00	.37709E+05
4645.44	5.10	4.80	739.1	0.135E+00	4.80	39.77	4.80	0.00	.38863E+05
4783.94	5.10	4.80	742.8	0.135E+00	4.80	39.97	4.80	0.00	.40017E+05
4922.45	5.10	4.80	746.4	0.134E+00	4.80	40.16	4.80	0.00	.41171E+05
5060.95	5.10	4.80	750.0	0.133E+00	4.80	40.36	4.80	0.00	.42325E+05
5199.45	5.10	4.80	753.5	0.133E+00	4.80	40.55	4.80	0.00	.43479E+05
5337.96	5.10	4.80	757.1	0.132E+00	4.80	40.74	4.80	0.00	.44633E+05
5476.46	5.10	4.80	760.6	0.131E+00	4.80	40.93	4.80	0.00	.45787E+05
5614.96	5.10	4.80	764.2	0.131E+00	4.80	41.12	4.80	0.00	.46941E+05
5753.47	5.10	4.80	767.7	0.130E+00	4.80	41.31	4.80	0.00	.48095E+05
5891.97	5.10	4.80	771.2	0.130E+00	4.80	41.50	4.80	0.00	.49249E+05
6030.47	5.10	4.80	774.7	0.129E+00	4.80	41.68	4.80	0.00	.50403E+05
6168.98	5.10	4.80	778.1	0.129E+00	4.80	41.87	4.80	0.00	.51557E+05
6307.48	5.10	4.80	781.6	0.128E+00	4.80	42.06	4.80	0.00	.52711E+05
6445.98	5.10	4.80	785.0	0.127E+00	4.80	42.24	4.80	0.00	.53865E+05
6584.49	5.10	4.80	788.4	0.127E+00	4.80	42.43	4.80	0.00	.55019E+05
6722.99	5.10	4.80	791.8	0.126E+00	4.80	42.61	4.80	0.00	.56173E+05
6861.49	5.10	4.80	795.2	0.126E+00	4.80	42.79	4.80	0.00	.57327E+05
7000.00	5.10	4.80	798.6	0.125E+00	4.80	42.97	4.80	0.00	.58481E+05

```
 Cumulative travel time =       58481.3711 sec  (   16.24 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario2
 FILE NAME:         E:\Projets\Nemaska\Scenarios\2\S2_Q22lps.prd
 Time stamp:        Tue Dec 16 09:24:37 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3220.00  QA    =    357.42  ICHREG= 1
 HA    =      4.60  HD    =      4.60
 UA    =      0.111 F     =      0.005 USTAR =0.2696E-02
 UW    =      1.800 UWSTAR=0.1968E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.2460

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    182.30  YB1   =    125.00  YB2   =    239.60
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.35
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    130.20  THETA =      0.00  SIGMA =      5.20  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.2460  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.01
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.02  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.26  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.26
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.60  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       182.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.473   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.60m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.14    0.38   267.9 0.373E+00   0.30    74.99 .17249E+02
```

2.99	0.27	0.52	378.5	0.264E+00	0.60	74.98	.34753E+02
4.48	0.41	0.65	463.3	0.216E+00	0.90	74.97	.52301E+02
5.98	0.54	0.78	534.8	0.187E+00	1.20	74.96	.69871E+02
7.47	0.68	0.92	597.9	0.167E+00	1.50	74.95	.87456E+02
8.96	0.82	1.05	654.8	0.153E+00	1.80	74.95	.10505E+03
10.46	0.95	1.19	707.2	0.141E+00	2.10	74.94	.12265E+03
11.95	1.09	1.32	756.0	0.132E+00	2.40	74.93	.14026E+03
13.44	1.22	1.45	801.8	0.125E+00	2.70	74.93	.15788E+03
14.94	1.36	1.59	845.1	0.118E+00	3.00	74.92	.17550E+03
16.43	1.50	1.72	886.3	0.113E+00	3.30	74.92	.19312E+03
17.93	1.63	1.85	925.7	0.108E+00	3.60	74.91	.21074E+03
19.42	1.77	1.99	963.4	0.104E+00	3.90	74.90	.22837E+03
20.91	1.90	2.12	999.7	0.100E+00	4.20	74.90	.24600E+03
22.41	2.04	2.26	1034.8	0.966E-01	4.50	74.90	.26363E+03
23.90	2.18	2.30	1068.7	0.936E-01	4.60	74.89	.28127E+03
25.40	2.31	2.30	1101.6	0.908E-01	4.60	74.89	.29891E+03
26.89	2.45	2.30	1133.5	0.882E-01	4.60	74.88	.31654E+03
28.38	2.58	2.30	1164.5	0.859E-01	4.60	74.88	.33418E+03
29.88	2.72	2.30	1194.7	0.837E-01	4.60	74.87	.35182E+03
31.37	2.85	2.30	1224.2	0.817E-01	4.60	74.87	.36947E+03
32.86	2.99	2.30	1253.0	0.798E-01	4.60	74.87	.38711E+03
34.36	3.13	2.30	1281.1	0.781E-01	4.60	74.86	.40475E+03
35.85	3.26	2.30	1308.7	0.764E-01	4.60	74.86	.42240E+03
37.35	3.40	2.30	1335.6	0.749E-01	4.60	74.86	.44005E+03
38.84	3.53	2.30	1362.1	0.734E-01	4.60	74.86	.45769E+03
40.33	3.67	2.30	1388.0	0.720E-01	4.60	74.85	.47534E+03
41.83	3.81	2.30	1413.4	0.707E-01	4.60	74.85	.49299E+03
43.32	3.94	2.30	1438.4	0.695E-01	4.60	74.85	.51064E+03
44.81	4.08	2.30	1463.0	0.684E-01	4.60	74.85	.52829E+03
46.31	4.21	2.30	1479.2	0.676E-01	4.60	74.84	.54593E+03
47.80	4.35	2.30	1479.2	0.676E-01	4.60	74.84	.56354E+03
49.30	4.49	2.30	1479.2	0.676E-01	4.60	74.84	.58115E+03
50.79	4.62	2.30	1479.2	0.676E-01	4.60	74.84	.59876E+03
52.28	4.76	2.30	1479.2	0.676E-01	4.60	74.84	.61637E+03
53.78	4.89	2.30	1479.2	0.676E-01	4.60	74.84	.63398E+03
55.27	5.03	2.30	1479.2	0.676E-01	4.60	74.83	.65159E+03
56.77	5.17	2.30	1479.2	0.676E-01	4.60	74.83	.66920E+03
58.26	5.30	2.30	1479.2	0.676E-01	4.60	74.83	.68681E+03
59.75	5.44	2.30	1479.2	0.676E-01	4.60	74.83	.70442E+03
61.25	5.57	2.30	1479.2	0.676E-01	4.60	74.83	.72204E+03
62.74	5.71	2.30	1479.2	0.676E-01	4.60	74.83	.73965E+03
64.23	5.85	2.30	1479.2	0.676E-01	4.60	74.83	.75726E+03
65.73	5.98	2.30	1479.2	0.676E-01	4.60	74.83	.77487E+03
67.22	6.12	2.30	1479.2	0.676E-01	4.60	74.83	.79248E+03
68.72	6.25	2.30	1479.2	0.676E-01	4.60	74.83	.81009E+03
70.21	6.39	2.30	1479.2	0.676E-01	4.60	74.83	.82770E+03
71.70	6.53	2.30	1479.2	0.676E-01	4.60	74.83	.84531E+03
73.20	6.66	2.30	1479.2	0.676E-01	4.60	74.83	.86292E+03
74.69	6.80	2.30	1479.2	0.676E-01	4.60	74.83	.88053E+03

Cumulative travel time = 880.5309 sec (0.24 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.277E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.346E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.69	6.80	4.60	1479.2	0.676E-01	4.60	31.86	4.60	0.00	.88053E+03
213.20	6.80	4.60	1489.0	0.672E-01	4.60	32.08	4.60	0.00	.21283E+04
351.70	6.80	4.60	1498.8	0.667E-01	4.60	32.29	4.60	0.00	.33760E+04
490.21	6.80	4.60	1508.5	0.663E-01	4.60	32.50	4.60	0.00	.46237E+04
628.72	6.80	4.60	1518.2	0.659E-01	4.60	32.70	4.60	0.00	.58714E+04
767.22	6.80	4.60	1527.8	0.655E-01	4.60	32.91	4.60	0.00	.71192E+04
905.73	6.80	4.60	1537.3	0.650E-01	4.60	33.12	4.60	0.00	.83669E+04
1044.23	6.80	4.60	1546.8	0.646E-01	4.60	33.32	4.60	0.00	.96146E+04
1182.74	6.80	4.60	1556.2	0.643E-01	4.60	33.52	4.60	0.00	.10862E+05
1321.25	6.80	4.60	1565.6	0.639E-01	4.60	33.73	4.60	0.00	.12110E+05
1459.75	6.80	4.60	1574.9	0.635E-01	4.60	33.93	4.60	0.00	.13358E+05
1598.26	6.80	4.60	1584.2	0.631E-01	4.60	34.13	4.60	0.00	.14606E+05
1736.77	6.80	4.60	1593.4	0.628E-01	4.60	34.32	4.60	0.00	.15853E+05
1875.27	6.80	4.60	1602.5	0.624E-01	4.60	34.52	4.60	0.00	.17101E+05
2013.78	6.80	4.60	1611.6	0.621E-01	4.60	34.72	4.60	0.00	.18349E+05
2152.28	6.80	4.60	1620.6	0.617E-01	4.60	34.91	4.60	0.00	.19596E+05
2290.79	6.80	4.60	1629.6	0.614E-01	4.60	35.11	4.60	0.00	.20844E+05

2429.30	6.80	4.60	1638.6	0.610E-01	4.60	35.30	4.60	0.00	.22092E+05
2567.80	6.80	4.60	1647.5	0.607E-01	4.60	35.49	4.60	0.00	.23340E+05
2706.31	6.80	4.60	1656.3	0.604E-01	4.60	35.68	4.60	0.00	.24587E+05
2844.81	6.80	4.60	1665.1	0.601E-01	4.60	35.87	4.60	0.00	.25835E+05
2983.32	6.80	4.60	1673.9	0.597E-01	4.60	36.06	4.60	0.00	.27083E+05
3121.83	6.80	4.60	1682.6	0.594E-01	4.60	36.25	4.60	0.00	.28331E+05
3260.33	6.80	4.60	1691.3	0.591E-01	4.60	36.43	4.60	0.00	.29578E+05
3398.84	6.80	4.60	1699.9	0.588E-01	4.60	36.62	4.60	0.00	.30826E+05
3537.35	6.80	4.60	1708.5	0.585E-01	4.60	36.80	4.60	0.00	.32074E+05
3675.85	6.80	4.60	1717.0	0.582E-01	4.60	36.99	4.60	0.00	.33321E+05
3814.36	6.80	4.60	1725.5	0.580E-01	4.60	37.17	4.60	0.00	.34569E+05
3952.86	6.80	4.60	1734.0	0.577E-01	4.60	37.35	4.60	0.00	.35817E+05
4091.37	6.80	4.60	1742.4	0.574E-01	4.60	37.53	4.60	0.00	.37065E+05
4229.88	6.80	4.60	1750.7	0.571E-01	4.60	37.71	4.60	0.00	.38312E+05
4368.38	6.80	4.60	1759.1	0.568E-01	4.60	37.89	4.60	0.00	.39560E+05
4506.89	6.80	4.60	1767.4	0.566E-01	4.60	38.07	4.60	0.00	.40808E+05
4645.40	6.80	4.60	1775.6	0.563E-01	4.60	38.25	4.60	0.00	.42056E+05
4783.90	6.80	4.60	1783.8	0.561E-01	4.60	38.43	4.60	0.00	.43303E+05
4922.41	6.80	4.60	1792.0	0.558E-01	4.60	38.60	4.60	0.00	.44551E+05
5060.91	6.80	4.60	1800.1	0.556E-01	4.60	38.78	4.60	0.00	.45799E+05
5199.42	6.80	4.60	1808.2	0.553E-01	4.60	38.95	4.60	0.00	.47046E+05
5337.93	6.80	4.60	1816.3	0.551E-01	4.60	39.13	4.60	0.00	.48294E+05
5476.43	6.80	4.60	1824.3	0.548E-01	4.60	39.30	4.60	0.00	.49542E+05
5614.94	6.80	4.60	1832.3	0.546E-01	4.60	39.47	4.60	0.00	.50790E+05
5753.45	6.80	4.60	1840.3	0.543E-01	4.60	39.64	4.60	0.00	.52037E+05
5891.95	6.80	4.60	1848.2	0.541E-01	4.60	39.81	4.60	0.00	.53285E+05
6030.46	6.80	4.60	1856.1	0.539E-01	4.60	39.98	4.60	0.00	.54533E+05
6168.96	6.80	4.60	1864.0	0.536E-01	4.60	40.15	4.60	0.00	.55781E+05
6307.47	6.80	4.60	1871.8	0.534E-01	4.60	40.32	4.60	0.00	.57028E+05
6445.98	6.80	4.60	1879.6	0.532E-01	4.60	40.49	4.60	0.00	.58276E+05
6584.48	6.80	4.60	1887.4	0.530E-01	4.60	40.66	4.60	0.00	.59524E+05
6722.99	6.80	4.60	1895.1	0.528E-01	4.60	40.82	4.60	0.00	.60771E+05
6861.50	6.80	4.60	1902.8	0.526E-01	4.60	40.99	4.60	0.00	.62019E+05
7000.00	6.80	4.60	1910.5	0.523E-01	4.60	41.15	4.60	0.00	.63267E+05

```
 Cumulative travel time =       63266.8594 sec  (   17.57 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario2
 FILE NAME:         E:\Projets\Nemaska\Scenarios\2\S2_Q40lps.prd
 Time stamp:        Tue Dec 16 09:25:26 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3220.00  QA    =    357.42  ICHREG= 1
 HA    =      4.60  HD    =      4.60
 UA    =      0.111 F     =      0.005 USTAR =0.2696E-02
 UW    =      1.800 UWSTAR=0.1968E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.2460

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    182.30  YB1   =    125.00  YB2   =    239.60
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.35
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    130.20  THETA =      0.00  SIGMA =      5.20  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.2460  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.86  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      9.56  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      9.56
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.60  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       182.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.950   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.60m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.14    0.38   148.2 0.675E+00   0.30    74.97 .16315E+02
```

2.99	0.27	0.52	209.1	0.478E+00	0.60	74.94	.33387E+02
4.48	0.41	0.65	255.9	0.391E+00	0.90	74.91	.50603E+02
5.98	0.54	0.78	295.3	0.339E+00	1.20	74.88	.67893E+02
7.47	0.68	0.92	330.1	0.303E+00	1.50	74.85	.85231E+02
8.96	0.82	1.05	361.5	0.277E+00	1.80	74.83	.10260E+03
10.46	0.95	1.19	390.4	0.256E+00	2.10	74.81	.12000E+03
11.95	1.09	1.32	417.2	0.240E+00	2.40	74.78	.13742E+03
13.44	1.22	1.45	442.5	0.226E+00	2.70	74.76	.15485E+03
14.94	1.36	1.59	466.4	0.214E+00	3.00	74.74	.17230E+03
16.43	1.50	1.72	489.1	0.204E+00	3.30	74.72	.18976E+03
17.93	1.63	1.85	510.8	0.196E+00	3.60	74.71	.20723E+03
19.42	1.77	1.99	531.6	0.188E+00	3.90	74.69	.22471E+03
20.91	1.90	2.12	551.6	0.181E+00	4.20	74.67	.24220E+03
22.41	2.04	2.26	571.0	0.175E+00	4.50	74.66	.25970E+03
23.90	2.18	2.30	589.7	0.170E+00	4.60	74.64	.27720E+03
25.40	2.31	2.30	607.8	0.165E+00	4.60	74.63	.29471E+03
26.89	2.45	2.30	625.4	0.160E+00	4.60	74.62	.31222E+03
28.38	2.58	2.30	642.5	0.156E+00	4.60	74.60	.32974E+03
29.88	2.72	2.30	659.1	0.152E+00	4.60	74.59	.34726E+03
31.37	2.85	2.30	675.4	0.148E+00	4.60	74.58	.36478E+03
32.86	2.99	2.30	691.3	0.145E+00	4.60	74.57	.38231E+03
34.36	3.13	2.30	706.8	0.141E+00	4.60	74.56	.39985E+03
35.85	3.26	2.30	721.9	0.139E+00	4.60	74.55	.41739E+03
37.35	3.40	2.30	736.8	0.136E+00	4.60	74.54	.43493E+03
38.84	3.53	2.30	751.4	0.133E+00	4.60	74.53	.45247E+03
40.33	3.67	2.30	765.7	0.131E+00	4.60	74.52	.47002E+03
41.83	3.81	2.30	779.7	0.128E+00	4.60	74.51	.48757E+03
43.32	3.94	2.30	793.5	0.126E+00	4.60	74.50	.50512E+03
44.81	4.08	2.30	807.0	0.124E+00	4.60	74.50	.52267E+03
46.31	4.21	2.30	815.9	0.123E+00	4.60	74.49	.54018E+03
47.80	4.35	2.30	815.9	0.123E+00	4.60	74.48	.55761E+03
49.30	4.49	2.30	815.9	0.123E+00	4.60	74.48	.57503E+03
50.79	4.62	2.30	815.9	0.123E+00	4.60	74.47	.59246E+03
52.28	4.76	2.30	815.9	0.123E+00	4.60	74.47	.60989E+03
53.78	4.89	2.30	815.9	0.123E+00	4.60	74.46	.62731E+03
55.27	5.03	2.30	815.9	0.123E+00	4.60	74.46	.64474E+03
56.77	5.17	2.30	815.9	0.123E+00	4.60	74.45	.66216E+03
58.26	5.30	2.30	815.9	0.123E+00	4.60	74.45	.67959E+03
59.75	5.44	2.30	815.9	0.123E+00	4.60	74.45	.69701E+03
61.25	5.57	2.30	815.9	0.123E+00	4.60	74.45	.71444E+03
62.74	5.71	2.30	815.9	0.123E+00	4.60	74.44	.73186E+03
64.23	5.85	2.30	815.9	0.123E+00	4.60	74.44	.74929E+03
65.73	5.98	2.30	815.9	0.123E+00	4.60	74.44	.76671E+03
67.22	6.12	2.30	815.9	0.123E+00	4.60	74.44	.78414E+03
68.72	6.25	2.30	815.9	0.123E+00	4.60	74.44	.80156E+03
70.21	6.39	2.30	815.9	0.123E+00	4.60	74.44	.81899E+03
71.70	6.53	2.30	815.9	0.123E+00	4.60	74.44	.83641E+03
73.20	6.66	2.30	815.9	0.123E+00	4.60	74.44	.85384E+03
74.69	6.80	2.30	815.9	0.123E+00	4.60	74.43	.87127E+03

Cumulative travel time = 871.2651 sec (0.24 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.277E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.346E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.69	6.80	4.60	815.9	0.123E+00	4.60	31.96	4.60	0.00	.87127E+03
213.20	6.80	4.60	821.4	0.122E+00	4.60	32.17	4.60	0.00	.21189E+04
351.70	6.80	4.60	826.7	0.121E+00	4.60	32.38	4.60	0.00	.33666E+04
490.21	6.80	4.60	832.1	0.120E+00	4.60	32.59	4.60	0.00	.46143E+04
628.72	6.80	4.60	837.3	0.119E+00	4.60	32.79	4.60	0.00	.58619E+04
767.22	6.80	4.60	842.6	0.119E+00	4.60	33.00	4.60	0.00	.71096E+04
905.73	6.80	4.60	847.8	0.118E+00	4.60	33.21	4.60	0.00	.83572E+04
1044.23	6.80	4.60	853.0	0.117E+00	4.60	33.41	4.60	0.00	.96049E+04
1182.74	6.80	4.60	858.2	0.117E+00	4.60	33.61	4.60	0.00	.10853E+05
1321.25	6.80	4.60	863.4	0.116E+00	4.60	33.81	4.60	0.00	.12100E+05
1459.75	6.80	4.60	868.5	0.115E+00	4.60	34.01	4.60	0.00	.13348E+05
1598.26	6.80	4.60	873.5	0.114E+00	4.60	34.21	4.60	0.00	.14596E+05
1736.77	6.80	4.60	878.6	0.114E+00	4.60	34.41	4.60	0.00	.15843E+05
1875.27	6.80	4.60	883.6	0.113E+00	4.60	34.61	4.60	0.00	.17091E+05
2013.78	6.80	4.60	888.6	0.113E+00	4.60	34.80	4.60	0.00	.18339E+05
2152.28	6.80	4.60	893.6	0.112E+00	4.60	35.00	4.60	0.00	.19586E+05
2290.79	6.80	4.60	898.5	0.111E+00	4.60	35.19	4.60	0.00	.20834E+05

2429.30	6.80	4.60	903.4	0.111E+00	4.60	35.38	4.60	0.00	.22082E+05
2567.80	6.80	4.60	908.3	0.110E+00	4.60	35.57	4.60	0.00	.23329E+05
2706.31	6.80	4.60	913.1	0.110E+00	4.60	35.76	4.60	0.00	.24577E+05
2844.81	6.80	4.60	918.0	0.109E+00	4.60	35.95	4.60	0.00	.25825E+05
2983.32	6.80	4.60	922.8	0.108E+00	4.60	36.14	4.60	0.00	.27072E+05
3121.83	6.80	4.60	927.6	0.108E+00	4.60	36.33	4.60	0.00	.28320E+05
3260.33	6.80	4.60	932.3	0.107E+00	4.60	36.51	4.60	0.00	.29568E+05
3398.84	6.80	4.60	937.0	0.107E+00	4.60	36.70	4.60	0.00	.30815E+05
3537.35	6.80	4.60	941.8	0.106E+00	4.60	36.88	4.60	0.00	.32063E+05
3675.85	6.80	4.60	946.4	0.106E+00	4.60	37.07	4.60	0.00	.33311E+05
3814.36	6.80	4.60	951.1	0.105E+00	4.60	37.25	4.60	0.00	.34558E+05
3952.86	6.80	4.60	955.7	0.105E+00	4.60	37.43	4.60	0.00	.35806E+05
4091.37	6.80	4.60	960.4	0.104E+00	4.60	37.61	4.60	0.00	.37054E+05
4229.88	6.80	4.60	964.9	0.104E+00	4.60	37.79	4.60	0.00	.38301E+05
4368.38	6.80	4.60	969.5	0.103E+00	4.60	37.97	4.60	0.00	.39549E+05
4506.89	6.80	4.60	974.1	0.103E+00	4.60	38.15	4.60	0.00	.40797E+05
4645.40	6.80	4.60	978.6	0.102E+00	4.60	38.33	4.60	0.00	.42044E+05
4783.90	6.80	4.60	983.1	0.102E+00	4.60	38.50	4.60	0.00	.43292E+05
4922.41	6.80	4.60	987.6	0.101E+00	4.60	38.68	4.60	0.00	.44540E+05
5060.91	6.80	4.60	992.1	0.101E+00	4.60	38.85	4.60	0.00	.45787E+05
5199.42	6.80	4.60	996.5	0.100E+00	4.60	39.03	4.60	0.00	.47035E+05
5337.93	6.80	4.60	1000.9	0.999E-01	4.60	39.20	4.60	0.00	.48282E+05
5476.43	6.80	4.60	1005.3	0.995E-01	4.60	39.37	4.60	0.00	.49530E+05
5614.94	6.80	4.60	1009.7	0.990E-01	4.60	39.55	4.60	0.00	.50778E+05
5753.45	6.80	4.60	1014.1	0.986E-01	4.60	39.72	4.60	0.00	.52025E+05
5891.95	6.80	4.60	1018.5	0.982E-01	4.60	39.89	4.60	0.00	.53273E+05
6030.46	6.80	4.60	1022.8	0.978E-01	4.60	40.06	4.60	0.00	.54521E+05
6168.96	6.80	4.60	1027.1	0.974E-01	4.60	40.23	4.60	0.00	.55768E+05
6307.47	6.80	4.60	1031.4	0.970E-01	4.60	40.40	4.60	0.00	.57016E+05
6445.98	6.80	4.60	1035.7	0.966E-01	4.60	40.56	4.60	0.00	.58264E+05
6584.48	6.80	4.60	1039.9	0.962E-01	4.60	40.73	4.60	0.00	.59511E+05
6722.99	6.80	4.60	1044.2	0.958E-01	4.60	40.90	4.60	0.00	.60759E+05
6861.50	6.80	4.60	1048.4	0.954E-01	4.60	41.06	4.60	0.00	.62007E+05
7000.00	6.80	4.60	1052.6	0.950E-01	4.60	41.23	4.60	0.00	.63254E+05

Cumulative travel time = 63254.4531 sec (17.57 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario2
 FILE NAME:         E:\Projets\Nemaska\Scenarios\2\S2_Q62lps.prd
 Time stamp:        Tue Dec 16 09:26:19 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3220.00  QA    =    357.42  ICHREG= 1
 HA    =      4.60  HD    =      4.60
 UA    =      0.111 F     =      0.005 USTAR =0.2696E-02
 UW    =      1.800 UWSTAR=0.1968E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.2460

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    182.30  YB1   =    125.00  YB2   =    239.60
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.35
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    130.20  THETA =      0.00  SIGMA =      5.20  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.2460  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.06
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.88  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.82  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.82
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.60  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       182.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.534   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.60m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.14    0.38    96.4 0.104E+01   0.30    74.92 .14730E+02
```

2.99	0.27	0.52	136.0	0.735E+00	0.60	74.85	.30967E+02
4.48	0.41	0.65	166.3	0.601E+00	0.90	74.78	.47533E+02
5.98	0.54	0.78	191.9	0.521E+00	1.20	74.72	.64273E+02
7.47	0.68	0.92	214.4	0.466E+00	1.50	74.66	.81123E+02
8.96	0.82	1.05	234.8	0.426E+00	1.80	74.60	.98054E+02
10.46	0.95	1.19	253.5	0.394E+00	2.10	74.54	.11504E+03
11.95	1.09	1.32	270.9	0.369E+00	2.40	74.49	.13208E+03
13.44	1.22	1.45	287.3	0.348E+00	2.70	74.44	.14916E+03
14.94	1.36	1.59	302.8	0.330E+00	3.00	74.40	.16627E+03
16.43	1.50	1.72	317.5	0.315E+00	3.30	74.35	.18341E+03
17.93	1.63	1.85	331.6	0.302E+00	3.60	74.31	.20058E+03
19.42	1.77	1.99	345.1	0.290E+00	3.90	74.27	.21776E+03
20.91	1.90	2.12	358.1	0.279E+00	4.20	74.24	.23497E+03
22.41	2.04	2.26	370.6	0.270E+00	4.50	74.20	.25219E+03
23.90	2.18	2.30	382.8	0.261E+00	4.60	74.17	.26943E+03
25.40	2.31	2.30	394.5	0.253E+00	4.60	74.13	.28668E+03
26.89	2.45	2.30	405.9	0.246E+00	4.60	74.10	.30394E+03
28.38	2.58	2.30	417.0	0.240E+00	4.60	74.07	.32122E+03
29.88	2.72	2.30	427.8	0.234E+00	4.60	74.04	.33850E+03
31.37	2.85	2.30	438.4	0.228E+00	4.60	74.02	.35580E+03
32.86	2.99	2.30	448.7	0.223E+00	4.60	73.99	.37310E+03
34.36	3.13	2.30	458.7	0.218E+00	4.60	73.97	.39042E+03
35.85	3.26	2.30	468.6	0.213E+00	4.60	73.94	.40774E+03
37.35	3.40	2.30	478.2	0.209E+00	4.60	73.92	.42507E+03
38.84	3.53	2.30	487.6	0.205E+00	4.60	73.90	.44241E+03
40.33	3.67	2.30	496.9	0.201E+00	4.60	73.88	.45975E+03
41.83	3.81	2.30	506.0	0.198E+00	4.60	73.86	.47710E+03
43.32	3.94	2.30	515.0	0.194E+00	4.60	73.84	.49446E+03
44.81	4.08	2.30	523.7	0.191E+00	4.60	73.82	.51182E+03
46.31	4.21	2.30	529.5	0.189E+00	4.60	73.81	.52909E+03
47.80	4.35	2.30	529.5	0.189E+00	4.60	73.79	.54615E+03
49.30	4.49	2.30	529.5	0.189E+00	4.60	73.78	.56322E+03
50.79	4.62	2.30	529.5	0.189E+00	4.60	73.77	.58029E+03
52.28	4.76	2.30	529.5	0.189E+00	4.60	73.75	.59736E+03
53.78	4.89	2.30	529.5	0.189E+00	4.60	73.74	.61442E+03
55.27	5.03	2.30	529.5	0.189E+00	4.60	73.73	.63149E+03
56.77	5.17	2.30	529.5	0.189E+00	4.60	73.72	.64856E+03
58.26	5.30	2.30	529.5	0.189E+00	4.60	73.72	.66563E+03
59.75	5.44	2.30	529.5	0.189E+00	4.60	73.71	.68269E+03
61.25	5.57	2.30	529.5	0.189E+00	4.60	73.70	.69976E+03
62.74	5.71	2.30	529.5	0.189E+00	4.60	73.70	.71683E+03
64.23	5.85	2.30	529.5	0.189E+00	4.60	73.69	.73390E+03
65.73	5.98	2.30	529.5	0.189E+00	4.60	73.69	.75096E+03
67.22	6.12	2.30	529.5	0.189E+00	4.60	73.69	.76803E+03
68.72	6.25	2.30	529.5	0.189E+00	4.60	73.68	.78510E+03
70.21	6.39	2.30	529.5	0.189E+00	4.60	73.68	.80216E+03
71.70	6.53	2.30	529.5	0.189E+00	4.60	73.68	.81923E+03
73.20	6.66	2.30	529.5	0.189E+00	4.60	73.68	.83630E+03
74.69	6.80	2.30	529.5	0.189E+00	4.60	73.68	.85337E+03

Cumulative travel time = 853.3666 sec (0.24 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.66 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.277E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.346E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.69	6.80	4.60	529.5	0.189E+00	4.60	32.14	4.60	0.00	.85337E+03
213.20	6.80	4.60	533.0	0.188E+00	4.60	32.35	4.60	0.00	.21010E+04
351.70	6.80	4.60	536.4	0.186E+00	4.60	32.56	4.60	0.00	.33485E+04
490.21	6.80	4.60	539.8	0.185E+00	4.60	32.77	4.60	0.00	.45961E+04
628.72	6.80	4.60	543.2	0.184E+00	4.60	32.98	4.60	0.00	.58437E+04
767.22	6.80	4.60	546.6	0.183E+00	4.60	33.18	4.60	0.00	.70913E+04
905.73	6.80	4.60	550.0	0.182E+00	4.60	33.39	4.60	0.00	.83389E+04
1044.23	6.80	4.60	553.3	0.181E+00	4.60	33.59	4.60	0.00	.95865E+04
1182.74	6.80	4.60	556.6	0.180E+00	4.60	33.79	4.60	0.00	.10834E+05
1321.25	6.80	4.60	559.9	0.179E+00	4.60	33.99	4.60	0.00	.12082E+05
1459.75	6.80	4.60	563.2	0.178E+00	4.60	34.19	4.60	0.00	.13329E+05
1598.26	6.80	4.60	566.5	0.177E+00	4.60	34.39	4.60	0.00	.14577E+05
1736.77	6.80	4.60	569.7	0.176E+00	4.60	34.58	4.60	0.00	.15824E+05
1875.27	6.80	4.60	572.9	0.175E+00	4.60	34.78	4.60	0.00	.17072E+05
2013.78	6.80	4.60	576.1	0.174E+00	4.60	34.97	4.60	0.00	.18320E+05
2152.28	6.80	4.60	579.3	0.173E+00	4.60	35.17	4.60	0.00	.19567E+05
2290.79	6.80	4.60	582.5	0.172E+00	4.60	35.36	4.60	0.00	.20815E+05

2429.30	6.80	4.60	585.6	0.171E+00	4.60	35.55	4.60	0.00	.22062E+05
2567.80	6.80	4.60	588.8	0.170E+00	4.60	35.74	4.60	0.00	.23310E+05
2706.31	6.80	4.60	591.9	0.169E+00	4.60	35.93	4.60	0.00	.24558E+05
2844.81	6.80	4.60	595.0	0.168E+00	4.60	36.12	4.60	0.00	.25805E+05
2983.32	6.80	4.60	598.1	0.167E+00	4.60	36.31	4.60	0.00	.27053E+05
3121.83	6.80	4.60	601.2	0.166E+00	4.60	36.49	4.60	0.00	.28300E+05
3260.33	6.80	4.60	604.2	0.166E+00	4.60	36.68	4.60	0.00	.29548E+05
3398.84	6.80	4.60	607.3	0.165E+00	4.60	36.86	4.60	0.00	.30795E+05
3537.35	6.80	4.60	610.3	0.164E+00	4.60	37.05	4.60	0.00	.32043E+05
3675.85	6.80	4.60	613.3	0.163E+00	4.60	37.23	4.60	0.00	.33291E+05
3814.36	6.80	4.60	616.3	0.162E+00	4.60	37.41	4.60	0.00	.34538E+05
3952.86	6.80	4.60	619.3	0.161E+00	4.60	37.59	4.60	0.00	.35786E+05
4091.37	6.80	4.60	622.2	0.161E+00	4.60	37.77	4.60	0.00	.37033E+05
4229.88	6.80	4.60	625.2	0.160E+00	4.60	37.95	4.60	0.00	.38281E+05
4368.38	6.80	4.60	628.1	0.159E+00	4.60	38.13	4.60	0.00	.39529E+05
4506.89	6.80	4.60	631.0	0.158E+00	4.60	38.31	4.60	0.00	.40776E+05
4645.40	6.80	4.60	633.9	0.158E+00	4.60	38.48	4.60	0.00	.42024E+05
4783.90	6.80	4.60	636.8	0.157E+00	4.60	38.66	4.60	0.00	.43271E+05
4922.41	6.80	4.60	639.7	0.156E+00	4.60	38.83	4.60	0.00	.44519E+05
5060.91	6.80	4.60	642.6	0.156E+00	4.60	39.01	4.60	0.00	.45766E+05
5199.42	6.80	4.60	645.5	0.155E+00	4.60	39.18	4.60	0.00	.47014E+05
5337.93	6.80	4.60	648.3	0.154E+00	4.60	39.35	4.60	0.00	.48262E+05
5476.43	6.80	4.60	651.1	0.154E+00	4.60	39.53	4.60	0.00	.49509E+05
5614.94	6.80	4.60	654.0	0.153E+00	4.60	39.70	4.60	0.00	.50757E+05
5753.45	6.80	4.60	656.8	0.152E+00	4.60	39.87	4.60	0.00	.52004E+05
5891.95	6.80	4.60	659.6	0.152E+00	4.60	40.04	4.60	0.00	.53252E+05
6030.46	6.80	4.60	662.4	0.151E+00	4.60	40.21	4.60	0.00	.54500E+05
6168.96	6.80	4.60	665.1	0.150E+00	4.60	40.37	4.60	0.00	.55747E+05
6307.47	6.80	4.60	667.9	0.150E+00	4.60	40.54	4.60	0.00	.56995E+05
6445.98	6.80	4.60	670.6	0.149E+00	4.60	40.71	4.60	0.00	.58242E+05
6584.48	6.80	4.60	673.4	0.149E+00	4.60	40.88	4.60	0.00	.59490E+05
6722.99	6.80	4.60	676.1	0.148E+00	4.60	41.04	4.60	0.00	.60738E+05
6861.50	6.80	4.60	678.8	0.147E+00	4.60	41.21	4.60	0.00	.61985E+05
7000.00	6.80	4.60	681.5	0.147E+00	4.60	41.37	4.60	0.00	.63233E+05

Cumulative travel time = 63232.7148 sec (17.56 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

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CORMIX2: Multiport Diffuser Discharges End of Prediction File

2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario3
 FILE NAME:         E:\Projets\Nemaska\Scenarios\3\S3_Q22lps.prd
 Time stamp:        Tue Dec 16 09:27:11 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3129.00  QA    =    306.64  ICHREG= 1
 HA    =      4.47  HD    =      4.47
 UA    =      0.098 F     =      0.005 USTAR =0.2392E-02
 UW    =      3.200 UWSTAR=0.3620E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.9443

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    180.75  YB1   =    125.00  YB2   =    236.50
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.22
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    132.00  THETA =      0.00  SIGMA =      7.00  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  998.9443  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.01
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.16  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.95  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      5.95
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```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.47  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       180.75 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
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-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.486   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.47m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.18    0.38   227.1 0.440E+00   0.30    74.99 .19895E+02
```

2.98	0.37	0.52	320.8	0.312E+00	0.60	74.97	.40189E+02
4.47	0.55	0.65	392.6	0.255E+00	0.90	74.96	.60553E+02
5.96	0.73	0.78	453.2	0.221E+00	1.20	74.95	.80954E+02
7.44	0.91	0.92	506.6	0.197E+00	1.50	74.94	.10138E+03
8.93	1.10	1.05	554.9	0.180E+00	1.80	74.93	.12182E+03
10.42	1.28	1.18	599.2	0.167E+00	2.10	74.92	.14227E+03
11.91	1.46	1.32	640.5	0.156E+00	2.40	74.91	.16274E+03
13.40	1.65	1.45	679.3	0.147E+00	2.70	74.90	.18321E+03
14.89	1.83	1.58	716.0	0.140E+00	3.00	74.89	.20368E+03
16.38	2.01	1.72	750.9	0.133E+00	3.30	74.88	.22417E+03
17.87	2.19	1.85	784.3	0.128E+00	3.60	74.87	.24466E+03
19.35	2.38	1.98	816.3	0.123E+00	3.90	74.87	.26515E+03
20.84	2.56	2.12	847.0	0.118E+00	4.20	74.86	.28565E+03
22.33	2.74	2.23	876.7	0.114E+00	4.47	74.85	.30615E+03
23.82	2.92	2.23	905.5	0.110E+00	4.47	74.85	.32665E+03
25.31	3.11	2.23	933.3	0.107E+00	4.47	74.84	.34716E+03
26.80	3.29	2.23	960.3	0.104E+00	4.47	74.84	.36767E+03
28.29	3.47	2.23	986.6	0.101E+00	4.47	74.83	.38818E+03
29.78	3.66	2.23	1012.2	0.988E-01	4.47	74.83	.40869E+03
31.27	3.84	2.23	1037.2	0.964E-01	4.47	74.82	.42921E+03
32.75	4.02	2.23	1061.6	0.942E-01	4.47	74.82	.44973E+03
34.24	4.20	2.23	1085.4	0.921E-01	4.47	74.81	.47025E+03
35.73	4.39	2.23	1108.7	0.902E-01	4.47	74.81	.49077E+03
37.22	4.57	2.23	1131.6	0.884E-01	4.47	74.80	.51129E+03
38.71	4.75	2.23	1154.0	0.867E-01	4.47	74.80	.53181E+03
40.20	4.94	2.23	1175.9	0.850E-01	4.47	74.80	.55234E+03
41.69	5.12	2.23	1197.5	0.835E-01	4.47	74.79	.57287E+03
43.18	5.30	2.23	1218.7	0.821E-01	4.47	74.79	.59339E+03
44.66	5.48	2.23	1235.3	0.809E-01	4.47	74.79	.61391E+03
46.15	5.67	2.23	1235.3	0.809E-01	4.47	74.78	.63437E+03
47.64	5.85	2.23	1235.3	0.809E-01	4.47	74.78	.65484E+03
49.13	6.03	2.23	1235.3	0.809E-01	4.47	74.78	.67530E+03
50.62	6.22	2.23	1235.3	0.809E-01	4.47	74.77	.69577E+03
52.11	6.40	2.23	1235.3	0.809E-01	4.47	74.77	.71623E+03
53.60	6.58	2.23	1235.3	0.809E-01	4.47	74.77	.73669E+03
55.09	6.76	2.23	1235.3	0.809E-01	4.47	74.77	.75716E+03
56.58	6.95	2.23	1235.3	0.809E-01	4.47	74.77	.77762E+03
58.06	7.13	2.23	1235.3	0.809E-01	4.47	74.77	.79808E+03
59.55	7.31	2.23	1235.3	0.809E-01	4.47	74.76	.81855E+03
61.04	7.49	2.23	1235.3	0.809E-01	4.47	74.76	.83901E+03
62.53	7.68	2.23	1235.3	0.809E-01	4.47	74.76	.85947E+03
64.02	7.86	2.23	1235.3	0.809E-01	4.47	74.76	.87994E+03
65.51	8.04	2.23	1235.3	0.809E-01	4.47	74.76	.90040E+03
67.00	8.23	2.23	1235.3	0.809E-01	4.47	74.76	.92087E+03
68.49	8.41	2.23	1235.3	0.809E-01	4.47	74.76	.94133E+03
69.97	8.59	2.23	1235.3	0.809E-01	4.47	74.76	.96179E+03
71.46	8.77	2.23	1235.3	0.809E-01	4.47	74.76	.98226E+03
72.95	8.96	2.23	1235.3	0.809E-01	4.47	74.76	.10027E+04
74.44	9.14	2.23	1235.3	0.809E-01	4.47	74.76	.10232E+04

Cumulative travel time = 1023.1842 sec (0.28 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.64 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.352E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.440E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.44	9.14	4.47	1235.3	0.809E-01	4.47	31.02	4.47	0.00	.10232E+04
212.95	9.14	4.47	1247.8	0.801E-01	4.47	31.33	4.47	0.00	.24365E+04
351.46	9.14	4.47	1260.2	0.794E-01	4.47	31.64	4.47	0.00	.38497E+04
489.97	9.14	4.47	1272.4	0.786E-01	4.47	31.95	4.47	0.00	.52630E+04
628.49	9.14	4.47	1284.6	0.778E-01	4.47	32.25	4.47	0.00	.66763E+04
767.00	9.14	4.47	1296.6	0.771E-01	4.47	32.56	4.47	0.00	.80896E+04
905.51	9.14	4.47	1308.5	0.764E-01	4.47	32.85	4.47	0.00	.95029E+04
1044.02	9.14	4.47	1320.3	0.757E-01	4.47	33.15	4.47	0.00	.10916E+05
1182.53	9.14	4.47	1332.0	0.751E-01	4.47	33.44	4.47	0.00	.12329E+05
1321.04	9.14	4.47	1343.6	0.744E-01	4.47	33.74	4.47	0.00	.13743E+05
1459.55	9.14	4.47	1355.1	0.738E-01	4.47	34.02	4.47	0.00	.15156E+05
1598.06	9.14	4.47	1366.5	0.732E-01	4.47	34.31	4.47	0.00	.16569E+05
1736.58	9.14	4.47	1377.8	0.726E-01	4.47	34.59	4.47	0.00	.17983E+05
1875.09	9.14	4.47	1389.0	0.720E-01	4.47	34.88	4.47	0.00	.19396E+05
2013.60	9.14	4.47	1400.1	0.714E-01	4.47	35.15	4.47	0.00	.20809E+05
2152.11	9.14	4.47	1411.1	0.709E-01	4.47	35.43	4.47	0.00	.22222E+05
2290.62	9.14	4.47	1422.1	0.703E-01	4.47	35.71	4.47	0.00	.23636E+05

2429.13	9.14	4.47	1432.9	0.698E-01	4.47	35.98	4.47	0.00	.25049E+05
2567.64	9.14	4.47	1443.7	0.693E-01	4.47	36.25	4.47	0.00	.26462E+05
2706.15	9.14	4.47	1454.4	0.688E-01	4.47	36.52	4.47	0.00	.27875E+05
2844.67	9.14	4.47	1465.0	0.683E-01	4.47	36.79	4.47	0.00	.29289E+05
2983.18	9.14	4.47	1475.6	0.678E-01	4.47	37.05	4.47	0.00	.30702E+05
3121.69	9.14	4.47	1486.1	0.673E-01	4.47	37.31	4.47	0.00	.32115E+05
3260.20	9.14	4.47	1496.5	0.668E-01	4.47	37.57	4.47	0.00	.33529E+05
3398.71	9.14	4.47	1506.8	0.664E-01	4.47	37.83	4.47	0.00	.34942E+05
3537.22	9.14	4.47	1517.0	0.659E-01	4.47	38.09	4.47	0.00	.36355E+05
3675.73	9.14	4.47	1527.2	0.655E-01	4.47	38.35	4.47	0.00	.37768E+05
3814.24	9.14	4.47	1537.4	0.650E-01	4.47	38.60	4.47	0.00	.39182E+05
3952.75	9.14	4.47	1547.4	0.646E-01	4.47	38.85	4.47	0.00	.40595E+05
4091.27	9.14	4.47	1557.4	0.642E-01	4.47	39.10	4.47	0.00	.42008E+05
4229.78	9.14	4.47	1567.3	0.638E-01	4.47	39.35	4.47	0.00	.43422E+05
4368.29	9.14	4.47	1577.2	0.634E-01	4.47	39.60	4.47	0.00	.44835E+05
4506.80	9.14	4.47	1587.0	0.630E-01	4.47	39.85	4.47	0.00	.46248E+05
4645.31	9.14	4.47	1596.7	0.626E-01	4.47	40.09	4.47	0.00	.47661E+05
4783.82	9.14	4.47	1606.4	0.623E-01	4.47	40.34	4.47	0.00	.49075E+05
4922.33	9.14	4.47	1616.0	0.619E-01	4.47	40.58	4.47	0.00	.50488E+05
5060.84	9.14	4.47	1625.6	0.615E-01	4.47	40.82	4.47	0.00	.51901E+05
5199.36	9.14	4.47	1635.1	0.612E-01	4.47	41.06	4.47	0.00	.53314E+05
5337.87	9.14	4.47	1644.6	0.608E-01	4.47	41.29	4.47	0.00	.54728E+05
5476.38	9.14	4.47	1654.0	0.605E-01	4.47	41.53	4.47	0.00	.56141E+05
5614.89	9.14	4.47	1663.3	0.601E-01	4.47	41.76	4.47	0.00	.57554E+05
5753.40	9.14	4.47	1672.6	0.598E-01	4.47	42.00	4.47	0.00	.58968E+05
5891.91	9.14	4.47	1681.9	0.595E-01	4.47	42.23	4.47	0.00	.60381E+05
6030.42	9.14	4.47	1691.1	0.591E-01	4.47	42.46	4.47	0.00	.61794E+05
6168.93	9.14	4.47	1700.2	0.588E-01	4.47	42.69	4.47	0.00	.63207E+05
6307.45	9.14	4.47	1709.3	0.585E-01	4.47	42.92	4.47	0.00	.64621E+05
6445.96	9.14	4.47	1718.4	0.582E-01	4.47	43.15	4.47	0.00	.66034E+05
6584.47	9.14	4.47	1727.4	0.579E-01	4.47	43.37	4.47	0.00	.67447E+05
6722.98	9.14	4.47	1736.3	0.576E-01	4.47	43.60	4.47	0.00	.68861E+05
6861.49	9.14	4.47	1745.2	0.573E-01	4.47	43.82	4.47	0.00	.70274E+05
7000.00	9.14	4.47	1754.1	0.570E-01	4.47	44.04	4.47	0.00	.71687E+05

Cumulative travel time = 71687.0859 sec (19.91 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario3
 FILE NAME:         E:\Projets\Nemaska\Scenarios\3\S3_Q40lps.prd
 Time stamp:        Tue Dec 16 09:28:08 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3129.00  QA    =    306.64  ICHREG= 1
 HA    =      4.47  HD    =      4.47
 UA    =      0.098 F     =      0.005 USTAR =0.2392E-02
 UW    =      3.200 UWSTAR=0.3620E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.9443

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    180.75  YB1   =    125.00  YB2   =    236.50
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.22
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    132.00  THETA =      0.00  SIGMA =      7.00  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  998.9443  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.03
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.10  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     10.83  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     10.83
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.47  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       180.75 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.964   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.47m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.18    0.38   125.8 0.795E+00   0.30    74.95 .18459E+02
```

2.98	0.37	0.52	177.5	0.563E+00	0.60	74.91	.38068E+02
4.47	0.55	0.65	217.1	0.461E+00	0.90	74.87	.57904E+02
5.96	0.73	0.78	250.6	0.399E+00	1.20	74.83	.77859E+02
7.44	0.91	0.92	280.0	0.357E+00	1.50	74.80	.97890E+02
8.93	1.10	1.05	306.7	0.326E+00	1.80	74.76	.11797E+03
10.42	1.28	1.18	331.2	0.302E+00	2.10	74.73	.13810E+03
11.91	1.46	1.32	354.0	0.283E+00	2.40	74.70	.15826E+03
13.40	1.65	1.45	375.4	0.266E+00	2.70	74.67	.17844E+03
14.89	1.83	1.58	395.6	0.253E+00	3.00	74.64	.19865E+03
16.38	2.01	1.72	414.9	0.241E+00	3.30	74.62	.21887E+03
17.87	2.19	1.85	433.3	0.231E+00	3.60	74.59	.23912E+03
19.35	2.38	1.98	450.9	0.222E+00	3.90	74.57	.25937E+03
20.84	2.56	2.12	467.9	0.214E+00	4.20	74.55	.27964E+03
22.33	2.74	2.23	484.3	0.206E+00	4.47	74.53	.29992E+03
23.82	2.92	2.23	500.2	0.200E+00	4.47	74.51	.32022E+03
25.31	3.11	2.23	515.5	0.194E+00	4.47	74.49	.34052E+03
26.80	3.29	2.23	530.5	0.189E+00	4.47	74.47	.36083E+03
28.29	3.47	2.23	545.0	0.184E+00	4.47	74.45	.38114E+03
29.78	3.66	2.23	559.1	0.179E+00	4.47	74.43	.40147E+03
31.27	3.84	2.23	572.9	0.175E+00	4.47	74.42	.42180E+03
32.75	4.02	2.23	586.3	0.171E+00	4.47	74.40	.44214E+03
34.24	4.20	2.23	599.5	0.167E+00	4.47	74.39	.46248E+03
35.73	4.39	2.23	612.4	0.163E+00	4.47	74.37	.48283E+03
37.22	4.57	2.23	625.0	0.160E+00	4.47	74.36	.50318E+03
38.71	4.75	2.23	637.3	0.157E+00	4.47	74.35	.52354E+03
40.20	4.94	2.23	649.4	0.154E+00	4.47	74.34	.54390E+03
41.69	5.12	2.23	661.3	0.151E+00	4.47	74.32	.56427E+03
43.18	5.30	2.23	673.0	0.149E+00	4.47	74.31	.58464E+03
44.66	5.48	2.23	682.2	0.147E+00	4.47	74.30	.60497E+03
46.15	5.67	2.23	682.2	0.147E+00	4.47	74.29	.62514E+03
47.64	5.85	2.23	682.2	0.147E+00	4.47	74.29	.64531E+03
49.13	6.03	2.23	682.2	0.147E+00	4.47	74.28	.66547E+03
50.62	6.22	2.23	682.2	0.147E+00	4.47	74.27	.68564E+03
52.11	6.40	2.23	682.2	0.147E+00	4.47	74.26	.70580E+03
53.60	6.58	2.23	682.2	0.147E+00	4.47	74.26	.72597E+03
55.09	6.76	2.23	682.2	0.147E+00	4.47	74.25	.74613E+03
56.58	6.95	2.23	682.2	0.147E+00	4.47	74.25	.76630E+03
58.06	7.13	2.23	682.2	0.147E+00	4.47	74.24	.78647E+03
59.55	7.31	2.23	682.2	0.147E+00	4.47	74.24	.80663E+03
61.04	7.49	2.23	682.2	0.147E+00	4.47	74.23	.82680E+03
62.53	7.68	2.23	682.2	0.147E+00	4.47	74.23	.84696E+03
64.02	7.86	2.23	682.2	0.147E+00	4.47	74.23	.86713E+03
65.51	8.04	2.23	682.2	0.147E+00	4.47	74.23	.88729E+03
67.00	8.23	2.23	682.2	0.147E+00	4.47	74.22	.90746E+03
68.49	8.41	2.23	682.2	0.147E+00	4.47	74.22	.92763E+03
69.97	8.59	2.23	682.2	0.147E+00	4.47	74.22	.94779E+03
71.46	8.77	2.23	682.2	0.147E+00	4.47	74.22	.96796E+03
72.95	8.96	2.23	682.2	0.147E+00	4.47	74.22	.98812E+03
74.44	9.14	2.23	682.2	0.147E+00	4.47	74.22	.10083E+04

Cumulative travel time = 1008.2893 sec (0.28 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.352E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.440E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.44	9.14	4.47	682.2	0.147E+00	4.47	31.14	4.47	0.00	.10083E+04
212.95	9.14	4.47	689.1	0.145E+00	4.47	31.46	4.47	0.00	.24215E+04
351.46	9.14	4.47	695.9	0.144E+00	4.47	31.77	4.47	0.00	.38347E+04
489.97	9.14	4.47	702.6	0.142E+00	4.47	32.07	4.47	0.00	.52479E+04
628.49	9.14	4.47	709.2	0.141E+00	4.47	32.38	4.47	0.00	.66611E+04
767.00	9.14	4.47	715.8	0.140E+00	4.47	32.68	4.47	0.00	.80743E+04
905.51	9.14	4.47	722.3	0.138E+00	4.47	32.97	4.47	0.00	.94875E+04
1044.02	9.14	4.47	728.8	0.137E+00	4.47	33.27	4.47	0.00	.10901E+05
1182.53	9.14	4.47	735.2	0.136E+00	4.47	33.56	4.47	0.00	.12314E+05
1321.04	9.14	4.47	741.5	0.135E+00	4.47	33.85	4.47	0.00	.13727E+05
1459.55	9.14	4.47	747.8	0.134E+00	4.47	34.14	4.47	0.00	.15140E+05
1598.06	9.14	4.47	754.1	0.133E+00	4.47	34.42	4.47	0.00	.16553E+05
1736.58	9.14	4.47	760.3	0.132E+00	4.47	34.71	4.47	0.00	.17967E+05
1875.09	9.14	4.47	766.4	0.130E+00	4.47	34.99	4.47	0.00	.19380E+05
2013.60	9.14	4.47	772.5	0.129E+00	4.47	35.27	4.47	0.00	.20793E+05
2152.11	9.14	4.47	778.6	0.128E+00	4.47	35.54	4.47	0.00	.22206E+05
2290.62	9.14	4.47	784.6	0.127E+00	4.47	35.82	4.47	0.00	.23619E+05

2429.13	9.14	4.47	790.5	0.126E+00	4.47	36.09	4.47	0.00	.25033E+05
2567.64	9.14	4.47	796.4	0.126E+00	4.47	36.36	4.47	0.00	.26446E+05
2706.15	9.14	4.47	802.3	0.125E+00	4.47	36.63	4.47	0.00	.27859E+05
2844.67	9.14	4.47	808.1	0.124E+00	4.47	36.89	4.47	0.00	.29272E+05
2983.18	9.14	4.47	813.9	0.123E+00	4.47	37.16	4.47	0.00	.30685E+05
3121.69	9.14	4.47	819.7	0.122E+00	4.47	37.42	4.47	0.00	.32099E+05
3260.20	9.14	4.47	825.4	0.121E+00	4.47	37.68	4.47	0.00	.33512E+05
3398.71	9.14	4.47	831.0	0.120E+00	4.47	37.94	4.47	0.00	.34925E+05
3537.22	9.14	4.47	836.7	0.120E+00	4.47	38.19	4.47	0.00	.36338E+05
3675.73	9.14	4.47	842.3	0.119E+00	4.47	38.45	4.47	0.00	.37751E+05
3814.24	9.14	4.47	847.8	0.118E+00	4.47	38.70	4.47	0.00	.39165E+05
3952.75	9.14	4.47	853.3	0.117E+00	4.47	38.95	4.47	0.00	.40578E+05
4091.27	9.14	4.47	858.8	0.116E+00	4.47	39.20	4.47	0.00	.41991E+05
4229.78	9.14	4.47	864.2	0.116E+00	4.47	39.45	4.47	0.00	.43404E+05
4368.29	9.14	4.47	869.7	0.115E+00	4.47	39.70	4.47	0.00	.44817E+05
4506.80	9.14	4.47	875.0	0.114E+00	4.47	39.95	4.47	0.00	.46231E+05
4645.31	9.14	4.47	880.4	0.114E+00	4.47	40.19	4.47	0.00	.47644E+05
4783.82	9.14	4.47	885.7	0.113E+00	4.47	40.43	4.47	0.00	.49057E+05
4922.33	9.14	4.47	891.0	0.112E+00	4.47	40.67	4.47	0.00	.50470E+05
5060.84	9.14	4.47	896.2	0.112E+00	4.47	40.91	4.47	0.00	.51883E+05
5199.36	9.14	4.47	901.4	0.111E+00	4.47	41.15	4.47	0.00	.53297E+05
5337.87	9.14	4.47	906.6	0.110E+00	4.47	41.39	4.47	0.00	.54710E+05
5476.38	9.14	4.47	911.8	0.110E+00	4.47	41.62	4.47	0.00	.56123E+05
5614.89	9.14	4.47	916.9	0.109E+00	4.47	41.86	4.47	0.00	.57536E+05
5753.40	9.14	4.47	922.0	0.108E+00	4.47	42.09	4.47	0.00	.58949E+05
5891.91	9.14	4.47	927.1	0.108E+00	4.47	42.32	4.47	0.00	.60362E+05
6030.42	9.14	4.47	932.1	0.107E+00	4.47	42.55	4.47	0.00	.61776E+05
6168.93	9.14	4.47	937.2	0.107E+00	4.47	42.78	4.47	0.00	.63189E+05
6307.45	9.14	4.47	942.2	0.106E+00	4.47	43.01	4.47	0.00	.64602E+05
6445.96	9.14	4.47	947.1	0.106E+00	4.47	43.24	4.47	0.00	.66015E+05
6584.47	9.14	4.47	952.1	0.105E+00	4.47	43.46	4.47	0.00	.67428E+05
6722.98	9.14	4.47	957.0	0.104E+00	4.47	43.69	4.47	0.00	.68842E+05
6861.49	9.14	4.47	961.9	0.104E+00	4.47	43.91	4.47	0.00	.70255E+05
7000.00	9.14	4.47	966.7	0.103E+00	4.47	44.13	4.47	0.00	.71668E+05

```
 Cumulative travel time =       71668.0391 sec  (   19.91 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario3
 FILE NAME:         E:\Projets\Nemaska\Scenarios\3\S3_Q62lps.prd
 Time stamp:        Tue Dec 16 09:28:56 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   3129.00  QA    =    306.64  ICHREG= 1
 HA    =      4.47  HD    =      4.47
 UA    =      0.098 F     =      0.005 USTAR =0.2392E-02
 UW    =      3.200 UWSTAR=0.3620E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.9443

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    180.75  YB1   =    125.00  YB2   =    236.50
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      4.22
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    132.00  THETA =      0.00  SIGMA =      7.00  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  998.9443  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.07
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      3.26  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     16.78  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     16.78
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.47  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       180.75 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.547   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.47m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.49     0.18    0.38    82.1 0.122E+01   0.30    74.89 .16154E+02
```

2.98	0.37	0.52	115.7	0.864E+00	0.60	74.79	.34466E+02
4.47	0.55	0.65	141.5	0.707E+00	0.90	74.70	.53284E+02
5.96	0.73	0.78	163.2	0.613E+00	1.20	74.61	.72372E+02
7.44	0.91	0.92	182.4	0.548E+00	1.50	74.53	.91634E+02
8.93	1.10	1.05	199.7	0.501E+00	1.80	74.45	.11102E+03
10.42	1.28	1.18	215.6	0.464E+00	2.10	74.38	.13050E+03
11.91	1.46	1.32	230.4	0.434E+00	2.40	74.31	.15006E+03
13.40	1.65	1.45	244.3	0.409E+00	2.70	74.24	.16968E+03
14.89	1.83	1.58	257.5	0.388E+00	3.00	74.18	.18936E+03
16.38	2.01	1.72	270.0	0.370E+00	3.30	74.12	.20907E+03
17.87	2.19	1.85	282.0	0.355E+00	3.60	74.06	.22883E+03
19.35	2.38	1.98	293.4	0.341E+00	3.90	74.01	.24862E+03
20.84	2.56	2.12	304.5	0.328E+00	4.20	73.95	.26844E+03
22.33	2.74	2.23	315.1	0.317E+00	4.47	73.90	.28829E+03
23.82	2.92	2.23	325.4	0.307E+00	4.47	73.86	.30816E+03
25.31	3.11	2.23	335.4	0.298E+00	4.47	73.81	.32805E+03
26.80	3.29	2.23	345.1	0.290E+00	4.47	73.77	.34797E+03
28.29	3.47	2.23	354.5	0.282E+00	4.47	73.73	.36790E+03
29.78	3.66	2.23	363.7	0.275E+00	4.47	73.69	.38785E+03
31.27	3.84	2.23	372.7	0.268E+00	4.47	73.65	.40781E+03
32.75	4.02	2.23	381.4	0.262E+00	4.47	73.62	.42779E+03
34.24	4.20	2.23	390.0	0.256E+00	4.47	73.58	.44779E+03
35.73	4.39	2.23	398.3	0.251E+00	4.47	73.55	.46779E+03
37.22	4.57	2.23	406.5	0.246E+00	4.47	73.52	.48781E+03
38.71	4.75	2.23	414.6	0.241E+00	4.47	73.49	.50784E+03
40.20	4.94	2.23	422.4	0.237E+00	4.47	73.46	.52788E+03
41.69	5.12	2.23	430.2	0.232E+00	4.47	73.44	.54794E+03
43.18	5.30	2.23	437.8	0.228E+00	4.47	73.41	.56800E+03
44.66	5.48	2.23	443.7	0.225E+00	4.47	73.39	.58797E+03
46.15	5.67	2.23	443.7	0.225E+00	4.47	73.37	.60757E+03
47.64	5.85	2.23	443.7	0.225E+00	4.47	73.34	.62717E+03
49.13	6.03	2.23	443.7	0.225E+00	4.47	73.33	.64677E+03
50.62	6.22	2.23	443.7	0.225E+00	4.47	73.31	.66637E+03
52.11	6.40	2.23	443.7	0.225E+00	4.47	73.29	.68597E+03
53.60	6.58	2.23	443.7	0.225E+00	4.47	73.28	.70557E+03
55.09	6.76	2.23	443.7	0.225E+00	4.47	73.26	.72516E+03
56.58	6.95	2.23	443.7	0.225E+00	4.47	73.25	.74476E+03
58.06	7.13	2.23	443.7	0.225E+00	4.47	73.24	.76436E+03
59.55	7.31	2.23	443.7	0.225E+00	4.47	73.23	.78396E+03
61.04	7.49	2.23	443.7	0.225E+00	4.47	73.22	.80356E+03
62.53	7.68	2.23	443.7	0.225E+00	4.47	73.22	.82316E+03
64.02	7.86	2.23	443.7	0.225E+00	4.47	73.21	.84276E+03
65.51	8.04	2.23	443.7	0.225E+00	4.47	73.21	.86236E+03
67.00	8.23	2.23	443.7	0.225E+00	4.47	73.20	.88196E+03
68.49	8.41	2.23	443.7	0.225E+00	4.47	73.20	.90156E+03
69.97	8.59	2.23	443.7	0.225E+00	4.47	73.19	.92115E+03
71.46	8.77	2.23	443.7	0.225E+00	4.47	73.19	.94075E+03
72.95	8.96	2.23	443.7	0.225E+00	4.47	73.19	.96035E+03
74.44	9.14	2.23	443.7	0.225E+00	4.47	73.19	.97995E+03

Cumulative travel time = 979.9515 sec (0.27 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.352E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.440E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
74.44	9.14	4.47	443.7	0.225E+00	4.47	31.40	4.47	0.00	.97995E+03
212.95	9.14	4.47	448.1	0.223E+00	4.47	31.71	4.47	0.00	.23930E+04
351.46	9.14	4.47	452.5	0.221E+00	4.47	32.01	4.47	0.00	.38061E+04
489.97	9.14	4.47	456.8	0.219E+00	4.47	32.32	4.47	0.00	.52192E+04
628.49	9.14	4.47	461.0	0.217E+00	4.47	32.62	4.47	0.00	.66323E+04
767.00	9.14	4.47	465.2	0.215E+00	4.47	32.92	4.47	0.00	.80454E+04
905.51	9.14	4.47	469.4	0.213E+00	4.47	33.21	4.47	0.00	.94585E+04
1044.02	9.14	4.47	473.5	0.211E+00	4.47	33.50	4.47	0.00	.10872E+05
1182.53	9.14	4.47	477.7	0.209E+00	4.47	33.79	4.47	0.00	.12285E+05
1321.04	9.14	4.47	481.7	0.208E+00	4.47	34.08	4.47	0.00	.13698E+05
1459.55	9.14	4.47	485.8	0.206E+00	4.47	34.37	4.47	0.00	.15111E+05
1598.06	9.14	4.47	489.8	0.204E+00	4.47	34.65	4.47	0.00	.16524E+05
1736.58	9.14	4.47	493.7	0.203E+00	4.47	34.93	4.47	0.00	.17937E+05
1875.09	9.14	4.47	497.7	0.201E+00	4.47	35.21	4.47	0.00	.19350E+05
2013.60	9.14	4.47	501.6	0.199E+00	4.47	35.49	4.47	0.00	.20763E+05
2152.11	9.14	4.47	505.5	0.198E+00	4.47	35.76	4.47	0.00	.22176E+05
2290.62	9.14	4.47	509.3	0.196E+00	4.47	36.03	4.47	0.00	.23589E+05

```
   2429.13     9.14    4.47   513.1 0.195E+00   4.47    36.31    4.47    0.00   .25003E+05
   2567.64     9.14    4.47   516.9 0.193E+00   4.47    36.57    4.47    0.00   .26416E+05
   2706.15     9.14    4.47   520.7 0.192E+00   4.47    36.84    4.47    0.00   .27829E+05
   2844.67     9.14    4.47   524.4 0.191E+00   4.47    37.10    4.47    0.00   .29242E+05
   2983.18     9.14    4.47   528.1 0.189E+00   4.47    37.37    4.47    0.00   .30655E+05
   3121.69     9.14    4.47   531.8 0.188E+00   4.47    37.63    4.47    0.00   .32068E+05
   3260.20     9.14    4.47   535.5 0.187E+00   4.47    37.89    4.47    0.00   .33481E+05
   3398.71     9.14    4.47   539.1 0.185E+00   4.47    38.14    4.47    0.00   .34894E+05
   3537.22     9.14    4.47   542.7 0.184E+00   4.47    38.40    4.47    0.00   .36307E+05
   3675.73     9.14    4.47   546.3 0.183E+00   4.47    38.65    4.47    0.00   .37720E+05
   3814.24     9.14    4.47   549.9 0.182E+00   4.47    38.90    4.47    0.00   .39133E+05
   3952.75     9.14    4.47   553.4 0.181E+00   4.47    39.16    4.47    0.00   .40547E+05
   4091.27     9.14    4.47   556.9 0.180E+00   4.47    39.40    4.47    0.00   .41960E+05
   4229.78     9.14    4.47   560.4 0.178E+00   4.47    39.65    4.47    0.00   .43373E+05
   4368.29     9.14    4.47   563.9 0.177E+00   4.47    39.90    4.47    0.00   .44786E+05
   4506.80     9.14    4.47   567.4 0.176E+00   4.47    40.14    4.47    0.00   .46199E+05
   4645.31     9.14    4.47   570.8 0.175E+00   4.47    40.38    4.47    0.00   .47612E+05
   4783.82     9.14    4.47   574.2 0.174E+00   4.47    40.63    4.47    0.00   .49025E+05
   4922.33     9.14    4.47   577.6 0.173E+00   4.47    40.87    4.47    0.00   .50438E+05
   5060.84     9.14    4.47   581.0 0.172E+00   4.47    41.10    4.47    0.00   .51851E+05
   5199.36     9.14    4.47   584.3 0.171E+00   4.47    41.34    4.47    0.00   .53264E+05
   5337.87     9.14    4.47   587.6 0.170E+00   4.47    41.58    4.47    0.00   .54678E+05
   5476.38     9.14    4.47   591.0 0.169E+00   4.47    41.81    4.47    0.00   .56091E+05
   5614.89     9.14    4.47   594.2 0.168E+00   4.47    42.04    4.47    0.00   .57504E+05
   5753.40     9.14    4.47   597.5 0.167E+00   4.47    42.28    4.47    0.00   .58917E+05
   5891.91     9.14    4.47   600.8 0.166E+00   4.47    42.51    4.47    0.00   .60330E+05
   6030.42     9.14    4.47   604.0 0.166E+00   4.47    42.74    4.47    0.00   .61743E+05
   6168.93     9.14    4.47   607.3 0.165E+00   4.47    42.96    4.47    0.00   .63156E+05
   6307.45     9.14    4.47   610.5 0.164E+00   4.47    43.19    4.47    0.00   .64569E+05
   6445.96     9.14    4.47   613.6 0.163E+00   4.47    43.42    4.47    0.00   .65982E+05
   6584.47     9.14    4.47   616.8 0.162E+00   4.47    43.64    4.47    0.00   .67395E+05
   6722.98     9.14    4.47   620.0 0.161E+00   4.47    43.87    4.47    0.00   .68808E+05
   6861.49     9.14    4.47   623.1 0.160E+00   4.47    44.09    4.47    0.00   .70222E+05
   7000.00     9.14    4.47   626.2 0.160E+00   4.47    44.31    4.47    0.00   .71635E+05
 Cumulative travel time =       71634.6406 sec  (   19.90 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario4
 FILE NAME:         E:\Projets\Nemaska\Scenarios\4\S4_Q22lps.prd
 Time stamp:        Wed Dec 17 08:56:38 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2800.00  QA    =    131.60  ICHREG= 1
 HA    =      4.00  HD    =      4.00
 UA    =      0.047 F     =      0.005 USTAR =0.1168E-02
 UW    =      1.600 UWSTAR=0.1741E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.1011

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  RIGHT     DISTB =    177.50  YB1   =    125.00  YB2   =    230.00
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.75
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    135.57  THETA =      0.00  SIGMA =     10.57  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.1011  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.04
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.41  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     12.42  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     12.42
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```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU4    2
 2  Applicable layer depth HS =     4.00  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       177.50 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.537   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

 The diffuser near-field dilution is REDUCED because of the PROXIMITY
   of the shoreline.
 Because of the strong ambient current the diffuser plume of this crossflowing
   discharge gets RAPIDLY DEFLECTED.
 A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
   layer depth.  Full mixing is achieved at a downstream distance of about
   five (5) layer depths.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, measured horizontally in Y-direction
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.25	1.0	0.100E+03	0.00	75.00	.00000E+00
1.47	0.00	0.38	70.5	0.142E+01	0.08	74.08	.31301E+02
2.94	0.01	0.51	99.2	0.101E+01	0.16	73.15	.62603E+02
4.41	0.01	0.64	121.3	0.824E+00	0.24	72.23	.93904E+02
5.88	0.01	0.76	139.9	0.715E+00	0.32	71.30	.12521E+03
7.36	0.01	0.89	156.3	0.640E+00	0.40	70.38	.15651E+03
8.83	0.02	1.02	171.2	0.584E+00	0.48	69.46	.18781E+03
10.30	0.02	1.15	184.8	0.541E+00	0.56	68.53	.21911E+03
11.77	0.02	1.28	197.5	0.506E+00	0.64	67.61	.25041E+03
13.24	0.02	1.41	209.4	0.478E+00	0.72	66.68	.28171E+03
14.71	0.03	1.54	220.7	0.453E+00	0.80	65.76	.31301E+03
16.18	0.03	1.67	231.4	0.432E+00	0.88	64.84	.34431E+03
17.65	0.03	1.79	241.7	0.414E+00	0.96	63.91	.37562E+03
19.13	0.03	1.92	251.5	0.398E+00	1.04	62.99	.40692E+03
20.60	0.04	2.00	260.9	0.383E+00	1.12	62.06	.43822E+03
22.07	0.04	2.00	270.1	0.370E+00	1.20	61.14	.46952E+03
23.54	0.04	2.00	278.9	0.359E+00	1.28	60.22	.50082E+03
25.01	0.05	2.00	287.4	0.348E+00	1.36	59.29	.53212E+03
26.48	0.05	2.00	295.7	0.338E+00	1.44	58.37	.56342E+03
27.95	0.05	2.00	303.8	0.329E+00	1.52	57.44	.59472E+03
29.42	0.05	2.00	311.7	0.321E+00	1.60	56.52	.62603E+03
30.89	0.06	2.00	319.4	0.313E+00	1.68	55.60	.65733E+03
32.37	0.06	2.00	326.9	0.306E+00	1.76	54.67	.68863E+03
33.84	0.06	2.00	334.2	0.299E+00	1.84	53.75	.71993E+03
35.31	0.06	2.00	341.3	0.293E+00	1.92	52.82	.75123E+03
36.78	0.07	2.00	348.4	0.287E+00	2.00	51.90	.78253E+03
38.25	0.07	2.00	355.2	0.281E+00	2.08	50.98	.81383E+03
39.72	0.07	2.00	362.0	0.276E+00	2.16	50.05	.84513E+03
41.19	0.07	2.00	368.6	0.271E+00	2.24	49.13	.87644E+03
42.66	0.08	2.00	375.1	0.267E+00	2.32	48.20	.90774E+03
44.13	0.08	2.00	381.5	0.262E+00	2.40	47.28	.93904E+03
45.61	0.08	2.00	387.8	0.258E+00	2.48	46.36	.97034E+03
47.08	0.09	2.00	394.0	0.254E+00	2.56	45.43	.10016E+04
48.55	0.09	2.00	400.1	0.250E+00	2.64	44.51	.10329E+04
50.02	0.09	2.00	406.1	0.246E+00	2.72	43.59	.10642E+04
51.49	0.09	2.00	412.0	0.243E+00	2.80	42.66	.10955E+04
52.96	0.10	2.00	417.8	0.239E+00	2.88	41.74	.11268E+04
54.43	0.10	2.00	423.6	0.236E+00	2.96	40.81	.11581E+04
55.90	0.10	2.00	429.3	0.233E+00	3.04	39.89	.11894E+04
57.38	0.10	2.00	434.9	0.230E+00	3.12	38.97	.12207E+04
58.85	0.11	2.00	440.4	0.227E+00	3.20	38.04	.12521E+04
60.32	0.11	2.00	445.8	0.224E+00	3.28	37.12	.12834E+04
61.79	0.11	2.00	451.2	0.222E+00	3.36	36.19	.13147E+04
63.26	0.11	2.00	456.6	0.219E+00	3.44	35.27	.13460E+04
64.73	0.12	2.00	461.8	0.217E+00	3.52	34.35	.13773E+04
66.20	0.12	2.00	467.0	0.214E+00	3.60	33.42	.14086E+04
67.67	0.12	2.00	472.2	0.212E+00	3.68	32.50	.14399E+04
69.14	0.13	2.00	477.3	0.210E+00	3.76	31.57	.14712E+04
70.62	0.13	2.00	482.3	0.207E+00	3.84	30.65	.15025E+04
72.09	0.13	2.00	487.3	0.205E+00	3.92	29.73	.15338E+04
73.56	0.13	2.00	492.2	0.203E+00	4.00	28.80	.15651E+04

Cumulative travel time = 1565.0634 sec (0.43 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

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** End of NEAR-FIELD REGION (NFR) **
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.152E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.190E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.56	0.13	4.00	492.2	0.203E+00	4.00	28.80	4.00	0.00	.15651E+04
212.09	0.13	4.00	497.4	0.201E+00	4.00	29.11	4.00	0.00	.45120E+04
350.62	0.13	4.00	502.6	0.199E+00	4.00	29.41	4.00	0.00	.74589E+04
489.14	0.13	4.00	507.7	0.197E+00	4.00	29.70	4.00	0.00	.10406E+05
627.67	0.13	4.00	512.7	0.195E+00	4.00	30.00	4.00	0.00	.13353E+05
766.20	0.13	4.00	517.7	0.193E+00	4.00	30.29	4.00	0.00	.16300E+05
904.73	0.13	4.00	522.7	0.191E+00	4.00	30.58	4.00	0.00	.19247E+05
1043.26	0.13	4.00	527.6	0.190E+00	4.00	30.87	4.00	0.00	.22194E+05
1181.79	0.13	4.00	532.4	0.188E+00	4.00	31.15	4.00	0.00	.25140E+05
1320.32	0.13	4.00	537.2	0.186E+00	4.00	31.43	4.00	0.00	.28087E+05
1458.85	0.13	4.00	542.0	0.185E+00	4.00	31.71	4.00	0.00	.31034E+05
1597.38	0.13	4.00	546.7	0.183E+00	4.00	31.99	4.00	0.00	.33981E+05
1735.90	0.13	4.00	551.4	0.181E+00	4.00	32.26	4.00	0.00	.36928E+05
1874.43	0.13	4.00	556.0	0.180E+00	4.00	32.53	4.00	0.00	.39875E+05
2012.96	0.13	4.00	560.6	0.178E+00	4.00	32.80	4.00	0.00	.42822E+05
2151.49	0.13	4.00	565.2	0.177E+00	4.00	33.07	4.00	0.00	.45769E+05
2290.02	0.13	4.00	569.7	0.176E+00	4.00	33.34	4.00	0.00	.48716E+05
2428.55	0.13	4.00	574.2	0.174E+00	4.00	33.60	4.00	0.00	.51663E+05
2567.08	0.13	4.00	578.7	0.173E+00	4.00	33.86	4.00	0.00	.54610E+05
2705.61	0.13	4.00	583.1	0.171E+00	4.00	34.12	4.00	0.00	.57557E+05
2844.13	0.13	4.00	587.5	0.170E+00	4.00	34.38	4.00	0.00	.60504E+05
2982.66	0.13	4.00	591.9	0.169E+00	4.00	34.63	4.00	0.00	.63451E+05
3121.19	0.13	4.00	596.2	0.168E+00	4.00	34.88	4.00	0.00	.66398E+05
3259.72	0.13	4.00	600.5	0.167E+00	4.00	35.14	4.00	0.00	.69344E+05
3398.25	0.13	4.00	604.8	0.165E+00	4.00	35.39	4.00	0.00	.72291E+05
3536.78	0.13	4.00	609.0	0.164E+00	4.00	35.63	4.00	0.00	.75238E+05

3675.31	0.13	4.00	613.2	0.163E+00	4.00	35.88	4.00	0.00	.78185E+05
3813.84	0.13	4.00	617.4	0.162E+00	4.00	36.12	4.00	0.00	.81132E+05
3952.36	0.13	4.00	621.6	0.161E+00	4.00	36.37	4.00	0.00	.84079E+05
4090.89	0.13	4.00	625.7	0.160E+00	4.00	36.61	4.00	0.00	.87026E+05
4229.42	0.13	4.00	629.8	0.159E+00	4.00	36.85	4.00	0.00	.89973E+05
4367.95	0.13	4.00	633.8	0.158E+00	4.00	37.09	4.00	0.00	.92920E+05
4506.48	0.13	4.00	637.9	0.157E+00	4.00	37.32	4.00	0.00	.95867E+05
4645.01	0.13	4.00	641.9	0.156E+00	4.00	37.56	4.00	0.00	.98814E+05
4783.54	0.13	4.00	645.9	0.155E+00	4.00	37.79	4.00	0.00	.10176E+06
4922.07	0.13	4.00	649.9	0.154E+00	4.00	38.02	4.00	0.00	.10471E+06
5060.60	0.13	4.00	653.8	0.153E+00	4.00	38.26	4.00	0.00	.10765E+06
5199.12	0.13	4.00	657.7	0.152E+00	4.00	38.48	4.00	0.00	.11060E+06
5337.65	0.13	4.00	661.6	0.151E+00	4.00	38.71	4.00	0.00	.11355E+06
5476.18	0.13	4.00	665.5	0.150E+00	4.00	38.94	4.00	0.00	.11650E+06
5614.71	0.13	4.00	669.4	0.149E+00	4.00	39.17	4.00	0.00	.11944E+06
5753.24	0.13	4.00	673.2	0.149E+00	4.00	39.39	4.00	0.00	.12239E+06
5891.77	0.13	4.00	677.0	0.148E+00	4.00	39.61	4.00	0.00	.12534E+06
6030.30	0.13	4.00	680.8	0.147E+00	4.00	39.83	4.00	0.00	.12828E+06
6168.83	0.13	4.00	684.6	0.146E+00	4.00	40.05	4.00	0.00	.13123E+06
6307.35	0.13	4.00	688.3	0.145E+00	4.00	40.27	4.00	0.00	.13418E+06
6445.88	0.13	4.00	692.0	0.145E+00	4.00	40.49	4.00	0.00	.13712E+06
6584.41	0.13	4.00	695.7	0.144E+00	4.00	40.71	4.00	0.00	.14007E+06
6722.94	0.13	4.00	699.4	0.143E+00	4.00	40.92	4.00	0.00	.14302E+06
6861.47	0.13	4.00	703.1	0.142E+00	4.00	41.14	4.00	0.00	.14596E+06
7000.00	0.13	4.00	706.8	0.141E+00	4.00	41.35	4.00	0.00	.14891E+06

```
 Cumulative travel time =      148911.5469 sec  (   41.36 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario4
 FILE NAME:         E:\Projets\Nemaska\Scenarios\4\S4_Q40lps.prd
 Time stamp:        Wed Dec 17 08:56:54 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2800.00  QA    =    131.60  ICHREG= 1
 HA    =      4.00  HD    =      4.00
 UA    =      0.047 F     =      0.005 USTAR =0.1168E-02
 UW    =      1.600 UWSTAR=0.1741E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.1011

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  RIGHT     DISTB =    177.50  YB1   =    125.00  YB2   =    230.00
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.75
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    135.57  THETA =      0.00  SIGMA =     10.57  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.1011  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.13
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      4.38  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     22.58  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     22.58
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 (slot)             (riser group)

FLOW CLASSIFICATION
 2222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU4    2
 2  Applicable layer depth HS =     4.00  2
 2222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       177.50 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.015   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

 The diffuser near-field dilution is REDUCED because of the PROXIMITY
   of the shoreline.
 Because of the strong ambient current the diffuser plume of this crossflowing
   discharge gets RAPIDLY DEFLECTED.
 A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
   layer depth.  Full mixing is achieved at a downstream distance of about
   five (5) layer depths.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, measured horizontally in Y-direction
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.25	1.0	0.100E+03	0.00	75.00	.00000E+00
1.47	0.01	0.38	40.0	0.250E+01	0.08	74.09	.31301E+02
2.94	0.02	0.51	56.1	0.178E+01	0.16	73.18	.62603E+02
4.41	0.03	0.64	68.5	0.146E+01	0.24	72.27	.93904E+02
5.88	0.04	0.76	79.0	0.127E+01	0.32	71.35	.12521E+03
7.36	0.04	0.89	88.2	0.113E+01	0.40	70.44	.15651E+03
8.83	0.05	1.02	96.5	0.104E+01	0.48	69.53	.18781E+03
10.30	0.06	1.15	104.1	0.960E+00	0.56	68.62	.21911E+03
11.77	0.07	1.28	111.2	0.899E+00	0.64	67.71	.25041E+03
13.24	0.08	1.41	117.9	0.848E+00	0.72	66.80	.28171E+03
14.71	0.09	1.54	124.3	0.805E+00	0.80	65.89	.31301E+03
16.18	0.10	1.67	130.3	0.768E+00	0.88	64.97	.34431E+03
17.65	0.11	1.79	136.0	0.735E+00	0.96	64.06	.37562E+03
19.13	0.11	1.92	141.5	0.707E+00	1.04	63.15	.40692E+03
20.60	0.12	2.00	146.8	0.681E+00	1.12	62.24	.43822E+03
22.07	0.13	2.00	152.0	0.658E+00	1.20	61.33	.46952E+03
23.54	0.14	2.00	156.9	0.637E+00	1.28	60.42	.50082E+03
25.01	0.15	2.00	161.7	0.618E+00	1.36	59.50	.53212E+03
26.48	0.16	2.00	166.4	0.601E+00	1.44	58.59	.56342E+03
27.95	0.17	2.00	170.9	0.585E+00	1.52	57.68	.59472E+03
29.42	0.18	2.00	175.3	0.570E+00	1.60	56.77	.62603E+03
30.89	0.19	2.00	179.6	0.557E+00	1.68	55.86	.65733E+03
32.37	0.19	2.00	183.8	0.544E+00	1.76	54.95	.68863E+03
33.84	0.20	2.00	187.9	0.532E+00	1.84	54.04	.71993E+03
35.31	0.21	2.00	191.9	0.521E+00	1.92	53.12	.75123E+03
36.78	0.22	2.00	195.9	0.511E+00	2.00	52.21	.78253E+03
38.25	0.23	2.00	199.7	0.501E+00	2.08	51.30	.81383E+03
39.72	0.24	2.00	203.5	0.491E+00	2.16	50.39	.84513E+03
41.19	0.25	2.00	207.2	0.483E+00	2.24	49.48	.87644E+03
42.66	0.26	2.00	210.9	0.474E+00	2.32	48.57	.90774E+03
44.13	0.26	2.00	214.5	0.466E+00	2.40	47.66	.93904E+03
45.61	0.27	2.00	218.0	0.459E+00	2.48	46.74	.97034E+03
47.08	0.28	2.00	221.5	0.452E+00	2.56	45.83	.10016E+04
48.55	0.29	2.00	224.9	0.445E+00	2.64	44.92	.10329E+04
50.02	0.30	2.00	228.3	0.438E+00	2.72	44.01	.10642E+04
51.49	0.31	2.00	231.6	0.432E+00	2.80	43.10	.10955E+04
52.96	0.32	2.00	234.9	0.426E+00	2.88	42.19	.11268E+04
54.43	0.33	2.00	238.1	0.420E+00	2.96	41.27	.11581E+04
55.90	0.33	2.00	241.3	0.414E+00	3.04	40.36	.11894E+04
57.38	0.34	2.00	244.4	0.409E+00	3.12	39.45	.12207E+04
58.85	0.35	2.00	247.5	0.404E+00	3.20	38.54	.12521E+04
60.32	0.36	2.00	250.6	0.399E+00	3.28	37.63	.12834E+04
61.79	0.37	2.00	253.6	0.394E+00	3.36	36.72	.13147E+04
63.26	0.38	2.00	256.6	0.390E+00	3.44	35.81	.13460E+04
64.73	0.39	2.00	259.5	0.385E+00	3.52	34.89	.13773E+04
66.20	0.40	2.00	262.5	0.381E+00	3.60	33.98	.14086E+04
67.67	0.41	2.00	265.3	0.377E+00	3.68	33.07	.14399E+04
69.14	0.41	2.00	268.2	0.373E+00	3.76	32.16	.14712E+04
70.62	0.42	2.00	271.0	0.369E+00	3.84	31.25	.15025E+04
72.09	0.43	2.00	273.8	0.365E+00	3.92	30.34	.15338E+04
73.56	0.44	2.00	276.6	0.362E+00	4.00	29.43	.15651E+04

Cumulative travel time = 1565.0634 sec (0.43 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

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** End of NEAR-FIELD REGION (NFR) **
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.152E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.190E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.56	0.44	4.00	276.6	0.362E+00	4.00	29.43	4.00	0.00	.15651E+04
212.09	0.44	4.00	279.4	0.358E+00	4.00	29.72	4.00	0.00	.45116E+04
350.62	0.44	4.00	282.2	0.354E+00	4.00	30.02	4.00	0.00	.74581E+04
489.14	0.44	4.00	284.9	0.351E+00	4.00	30.31	4.00	0.00	.10405E+05
627.67	0.44	4.00	287.6	0.348E+00	4.00	30.60	4.00	0.00	.13351E+05
766.20	0.44	4.00	290.3	0.344E+00	4.00	30.89	4.00	0.00	.16298E+05
904.73	0.44	4.00	293.0	0.341E+00	4.00	31.17	4.00	0.00	.19244E+05
1043.26	0.44	4.00	295.6	0.338E+00	4.00	31.45	4.00	0.00	.22191E+05
1181.79	0.44	4.00	298.3	0.335E+00	4.00	31.73	4.00	0.00	.25137E+05
1320.32	0.44	4.00	300.8	0.332E+00	4.00	32.01	4.00	0.00	.28084E+05
1458.85	0.44	4.00	303.4	0.330E+00	4.00	32.28	4.00	0.00	.31030E+05
1597.38	0.44	4.00	306.0	0.327E+00	4.00	32.55	4.00	0.00	.33977E+05
1735.90	0.44	4.00	308.5	0.324E+00	4.00	32.82	4.00	0.00	.36923E+05
1874.43	0.44	4.00	311.0	0.322E+00	4.00	33.09	4.00	0.00	.39870E+05
2012.96	0.44	4.00	313.5	0.319E+00	4.00	33.35	4.00	0.00	.42816E+05
2151.49	0.44	4.00	316.0	0.316E+00	4.00	33.62	4.00	0.00	.45763E+05
2290.02	0.44	4.00	318.4	0.314E+00	4.00	33.88	4.00	0.00	.48709E+05
2428.55	0.44	4.00	320.9	0.312E+00	4.00	34.13	4.00	0.00	.51656E+05
2567.08	0.44	4.00	323.3	0.309E+00	4.00	34.39	4.00	0.00	.54603E+05
2705.61	0.44	4.00	325.7	0.307E+00	4.00	34.65	4.00	0.00	.57549E+05
2844.13	0.44	4.00	328.1	0.305E+00	4.00	34.90	4.00	0.00	.60496E+05
2982.66	0.44	4.00	330.4	0.303E+00	4.00	35.15	4.00	0.00	.63442E+05
3121.19	0.44	4.00	332.8	0.301E+00	4.00	35.40	4.00	0.00	.66389E+05
3259.72	0.44	4.00	335.1	0.298E+00	4.00	35.65	4.00	0.00	.69335E+05
3398.25	0.44	4.00	337.4	0.296E+00	4.00	35.89	4.00	0.00	.72282E+05
3536.78	0.44	4.00	339.7	0.294E+00	4.00	36.14	4.00	0.00	.75228E+05

3675.31	0.44	4.00	342.0	0.292E+00	4.00	36.38	4.00	0.00	.78175E+05
3813.84	0.44	4.00	344.3	0.290E+00	4.00	36.62	4.00	0.00	.81121E+05
3952.36	0.44	4.00	346.5	0.289E+00	4.00	36.86	4.00	0.00	.84068E+05
4090.89	0.44	4.00	348.7	0.287E+00	4.00	37.10	4.00	0.00	.87014E+05
4229.42	0.44	4.00	351.0	0.285E+00	4.00	37.34	4.00	0.00	.89961E+05
4367.95	0.44	4.00	353.2	0.283E+00	4.00	37.57	4.00	0.00	.92907E+05
4506.48	0.44	4.00	355.4	0.281E+00	4.00	37.81	4.00	0.00	.95854E+05
4645.01	0.44	4.00	357.6	0.280E+00	4.00	38.04	4.00	0.00	.98800E+05
4783.54	0.44	4.00	359.7	0.278E+00	4.00	38.27	4.00	0.00	.10175E+06
4922.07	0.44	4.00	361.9	0.276E+00	4.00	38.50	4.00	0.00	.10469E+06
5060.60	0.44	4.00	364.0	0.275E+00	4.00	38.73	4.00	0.00	.10764E+06
5199.12	0.44	4.00	366.2	0.273E+00	4.00	38.95	4.00	0.00	.11059E+06
5337.65	0.44	4.00	368.3	0.272E+00	4.00	39.18	4.00	0.00	.11353E+06
5476.18	0.44	4.00	370.4	0.270E+00	4.00	39.40	4.00	0.00	.11648E+06
5614.71	0.44	4.00	372.5	0.268E+00	4.00	39.63	4.00	0.00	.11943E+06
5753.24	0.44	4.00	374.6	0.267E+00	4.00	39.85	4.00	0.00	.12237E+06
5891.77	0.44	4.00	376.6	0.266E+00	4.00	40.07	4.00	0.00	.12532E+06
6030.30	0.44	4.00	378.7	0.264E+00	4.00	40.29	4.00	0.00	.12827E+06
6168.83	0.44	4.00	380.7	0.263E+00	4.00	40.50	4.00	0.00	.13121E+06
6307.35	0.44	4.00	382.8	0.261E+00	4.00	40.72	4.00	0.00	.13416E+06
6445.88	0.44	4.00	384.8	0.260E+00	4.00	40.94	4.00	0.00	.13711E+06
6584.41	0.44	4.00	386.8	0.259E+00	4.00	41.15	4.00	0.00	.14005E+06
6722.94	0.44	4.00	388.8	0.257E+00	4.00	41.36	4.00	0.00	.14300E+06
6861.47	0.44	4.00	390.8	0.256E+00	4.00	41.58	4.00	0.00	.14594E+06
7000.00	0.44	4.00	392.8	0.255E+00	4.00	41.79	4.00	0.00	.14889E+06

Cumulative travel time = 148891.3906 sec (41.36 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario4
 FILE NAME:         E:\Projets\Nemaska\Scenarios\4\S4_Q62lps.prd
 Time stamp:        Wed Dec 17 08:57:09 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2800.00  QA    =    131.60  ICHREG= 1
 HA    =      4.00  HD    =      4.00
 UA    =      0.047 F     =      0.005 USTAR =0.1168E-02
 UW    =      1.600 UWSTAR=0.1741E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.1011

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  RIGHT     DISTB =    177.50  YB1   =    125.00  YB2   =    230.00
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.75
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    135.57  THETA =      0.00  SIGMA =     10.57  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.1011  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.31
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      6.79  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     34.99  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     34.99
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 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU4    2
 2  Applicable layer depth HS =     4.00  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       177.50 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.598   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

 The diffuser near-field dilution is REDUCED because of the PROXIMITY
   of the shoreline.
 Because of the strong ambient current the diffuser plume of this crossflowing
   discharge gets RAPIDLY DEFLECTED.
 A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
   layer depth.  Full mixing is achieved at a downstream distance of about
   five (5) layer depths.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, measured horizontally in Y-direction
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.25	1.0	0.100E+03	0.00	75.00	.00000E+00
1.47	0.02	0.38	27.1	0.369E+01	0.08	74.11	.31301E+02
2.94	0.04	0.51	37.9	0.264E+01	0.16	73.22	.62603E+02
4.41	0.06	0.64	46.2	0.216E+01	0.24	72.34	.93904E+02
5.88	0.08	0.76	53.2	0.188E+01	0.32	71.45	.12521E+03
7.36	0.11	0.89	59.4	0.168E+01	0.40	70.56	.15651E+03
8.83	0.13	1.02	65.0	0.154E+01	0.48	69.67	.18781E+03
10.30	0.15	1.15	70.1	0.143E+01	0.56	68.79	.21911E+03
11.77	0.17	1.28	74.9	0.134E+01	0.64	67.90	.25041E+03
13.24	0.19	1.41	79.3	0.126E+01	0.72	67.01	.28171E+03
14.71	0.21	1.54	83.6	0.120E+01	0.80	66.12	.31301E+03
16.18	0.23	1.67	87.6	0.114E+01	0.88	65.23	.34431E+03
17.65	0.25	1.79	91.4	0.109E+01	0.96	64.35	.37562E+03
19.13	0.28	1.92	95.1	0.105E+01	1.04	63.46	.40692E+03
20.60	0.30	2.00	98.7	0.101E+01	1.12	62.57	.43822E+03
22.07	0.32	2.00	102.1	0.979E+00	1.20	61.68	.46952E+03
23.54	0.34	2.00	105.4	0.948E+00	1.28	60.79	.50082E+03
25.01	0.36	2.00	108.7	0.920E+00	1.36	59.91	.53212E+03
26.48	0.38	2.00	111.8	0.895E+00	1.44	59.02	.56342E+03
27.95	0.40	2.00	114.8	0.871E+00	1.52	58.13	.59472E+03
29.42	0.42	2.00	117.8	0.849E+00	1.60	57.24	.62603E+03
30.89	0.44	2.00	120.7	0.829E+00	1.68	56.36	.65733E+03
32.37	0.47	2.00	123.5	0.810E+00	1.76	55.47	.68863E+03
33.84	0.49	2.00	126.2	0.792E+00	1.84	54.58	.71993E+03
35.31	0.51	2.00	128.9	0.776E+00	1.92	53.69	.75123E+03
36.78	0.53	2.00	131.6	0.760E+00	2.00	52.80	.78253E+03
38.25	0.55	2.00	134.1	0.746E+00	2.08	51.92	.81383E+03
39.72	0.57	2.00	136.7	0.732E+00	2.16	51.03	.84513E+03
41.19	0.59	2.00	139.2	0.719E+00	2.24	50.14	.87644E+03
42.66	0.61	2.00	141.6	0.706E+00	2.32	49.25	.90774E+03
44.13	0.64	2.00	144.0	0.694E+00	2.40	48.37	.93904E+03
45.61	0.66	2.00	146.4	0.683E+00	2.48	47.48	.97034E+03
47.08	0.68	2.00	148.7	0.672E+00	2.56	46.59	.10016E+04
48.55	0.70	2.00	151.0	0.662E+00	2.64	45.70	.10329E+04
50.02	0.72	2.00	153.2	0.653E+00	2.72	44.81	.10642E+04
51.49	0.74	2.00	155.5	0.643E+00	2.80	43.93	.10955E+04
52.96	0.76	2.00	157.7	0.634E+00	2.88	43.04	.11268E+04
54.43	0.78	2.00	159.8	0.626E+00	2.96	42.15	.11581E+04
55.90	0.80	2.00	162.0	0.617E+00	3.04	41.26	.11894E+04
57.38	0.83	2.00	164.1	0.610E+00	3.12	40.37	.12207E+04
58.85	0.85	2.00	166.1	0.602E+00	3.20	39.49	.12521E+04
60.32	0.87	2.00	168.2	0.595E+00	3.28	38.60	.12834E+04
61.79	0.89	2.00	170.2	0.587E+00	3.36	37.71	.13147E+04
63.26	0.91	2.00	172.2	0.581E+00	3.44	36.82	.13460E+04
64.73	0.93	2.00	174.2	0.574E+00	3.52	35.94	.13773E+04
66.20	0.95	2.00	176.2	0.568E+00	3.60	35.05	.14086E+04
67.67	0.97	2.00	178.1	0.562E+00	3.68	34.16	.14399E+04
69.14	0.99	2.00	180.0	0.556E+00	3.76	33.27	.14712E+04
70.62	1.02	2.00	181.9	0.550E+00	3.84	32.38	.15025E+04
72.09	1.04	2.00	183.8	0.544E+00	3.92	31.50	.15338E+04
73.56	1.06	2.00	185.6	0.539E+00	4.00	30.61	.15651E+04

Cumulative travel time = 1565.0634 sec (0.43 hrs)

Plume centerline may exhibit slight discontinuities in transition to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT

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** End of NEAR-FIELD REGION (NFR) **
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BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.152E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.190E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.56	1.06	4.00	185.6	0.539E+00	4.00	30.61	4.00	0.00	.15651E+04
212.09	1.06	4.00	187.4	0.534E+00	4.00	30.89	4.00	0.00	.45111E+04
350.62	1.06	4.00	189.1	0.529E+00	4.00	31.18	4.00	0.00	.74571E+04
489.14	1.06	4.00	190.8	0.524E+00	4.00	31.46	4.00	0.00	.10403E+05
627.67	1.06	4.00	192.5	0.520E+00	4.00	31.74	4.00	0.00	.13349E+05
766.20	1.06	4.00	194.2	0.515E+00	4.00	32.01	4.00	0.00	.16295E+05
904.73	1.06	4.00	195.8	0.511E+00	4.00	32.29	4.00	0.00	.19241E+05
1043.26	1.06	4.00	197.5	0.506E+00	4.00	32.56	4.00	0.00	.22187E+05
1181.79	1.06	4.00	199.1	0.502E+00	4.00	32.83	4.00	0.00	.25133E+05
1320.32	1.06	4.00	200.7	0.498E+00	4.00	33.10	4.00	0.00	.28079E+05
1458.85	1.06	4.00	202.3	0.494E+00	4.00	33.36	4.00	0.00	.31025E+05
1597.38	1.06	4.00	203.9	0.490E+00	4.00	33.62	4.00	0.00	.33971E+05
1735.90	1.06	4.00	205.5	0.487E+00	4.00	33.88	4.00	0.00	.36917E+05
1874.43	1.06	4.00	207.1	0.483E+00	4.00	34.14	4.00	0.00	.39864E+05
2012.96	1.06	4.00	208.6	0.479E+00	4.00	34.40	4.00	0.00	.42810E+05
2151.49	1.06	4.00	210.2	0.476E+00	4.00	34.65	4.00	0.00	.45756E+05
2290.02	1.06	4.00	211.7	0.472E+00	4.00	34.91	4.00	0.00	.48702E+05
2428.55	1.06	4.00	213.2	0.469E+00	4.00	35.16	4.00	0.00	.51648E+05
2567.08	1.06	4.00	214.7	0.466E+00	4.00	35.41	4.00	0.00	.54594E+05
2705.61	1.06	4.00	216.2	0.462E+00	4.00	35.66	4.00	0.00	.57540E+05
2844.13	1.06	4.00	217.7	0.459E+00	4.00	35.90	4.00	0.00	.60486E+05
2982.66	1.06	4.00	219.2	0.456E+00	4.00	36.15	4.00	0.00	.63432E+05
3121.19	1.06	4.00	220.7	0.453E+00	4.00	36.39	4.00	0.00	.66378E+05
3259.72	1.06	4.00	222.1	0.450E+00	4.00	36.63	4.00	0.00	.69324E+05
3398.25	1.06	4.00	223.6	0.447E+00	4.00	36.87	4.00	0.00	.72270E+05
3536.78	1.06	4.00	225.0	0.444E+00	4.00	37.11	4.00	0.00	.75216E+05

```
   3675.31      1.06     4.00    226.5 0.442E+00   4.00     37.34    4.00     0.00    .78162E+05
   3813.84      1.06     4.00    227.9 0.439E+00   4.00     37.58    4.00     0.00    .81108E+05
   3952.36      1.06     4.00    229.3 0.436E+00   4.00     37.81    4.00     0.00    .84054E+05
   4090.89      1.06     4.00    230.7 0.433E+00   4.00     38.04    4.00     0.00    .87000E+05
   4229.42      1.06     4.00    232.1 0.431E+00   4.00     38.28    4.00     0.00    .89946E+05
   4367.95      1.06     4.00    233.5 0.428E+00   4.00     38.50    4.00     0.00    .92892E+05
   4506.48      1.06     4.00    234.9 0.426E+00   4.00     38.73    4.00     0.00    .95838E+05
   4645.01      1.06     4.00    236.3 0.423E+00   4.00     38.96    4.00     0.00    .98784E+05
   4783.54      1.06     4.00    237.6 0.421E+00   4.00     39.18    4.00     0.00    .10173E+06
   4922.07      1.06     4.00    239.0 0.418E+00   4.00     39.41    4.00     0.00    .10468E+06
   5060.60      1.06     4.00    240.3 0.416E+00   4.00     39.63    4.00     0.00    .10762E+06
   5199.12      1.06     4.00    241.7 0.414E+00   4.00     39.85    4.00     0.00    .11057E+06
   5337.65      1.06     4.00    243.0 0.411E+00   4.00     40.07    4.00     0.00    .11351E+06
   5476.18      1.06     4.00    244.4 0.409E+00   4.00     40.29    4.00     0.00    .11646E+06
   5614.71      1.06     4.00    245.7 0.407E+00   4.00     40.51    4.00     0.00    .11941E+06
   5753.24      1.06     4.00    247.0 0.405E+00   4.00     40.73    4.00     0.00    .12235E+06
   5891.77      1.06     4.00    248.3 0.403E+00   4.00     40.94    4.00     0.00    .12530E+06
   6030.30      1.06     4.00    249.6 0.401E+00   4.00     41.16    4.00     0.00    .12824E+06
   6168.83      1.06     4.00    250.9 0.399E+00   4.00     41.37    4.00     0.00    .13119E+06
   6307.35      1.06     4.00    252.2 0.397E+00   4.00     41.58    4.00     0.00    .13414E+06
   6445.88      1.06     4.00    253.5 0.395E+00   4.00     41.79    4.00     0.00    .13708E+06
   6584.41      1.06     4.00    254.7 0.393E+00   4.00     42.00    4.00     0.00    .14003E+06
   6722.94      1.06     4.00    256.0 0.391E+00   4.00     42.21    4.00     0.00    .14297E+06
   6861.47      1.06     4.00    257.3 0.389E+00   4.00     42.42    4.00     0.00    .14592E+06
   7000.00      1.06     4.00    258.5 0.387E+00   4.00     42.63    4.00     0.00    .14887E+06
 Cumulative travel time =      148866.7812 sec  (   41.35 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario5
 FILE NAME:         E:\Projets\Nemaska\Scenarios\5\S5_Q22lps.prd
 Time stamp:        Tue Dec 16 09:30:13 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2940.00  QA    =    220.50  ICHREG= 1
 HA    =      4.20  HD    =      4.20
 UA    =      0.075 F     =      0.005 USTAR =0.1849E-02
 UW    =      3.300 UWSTAR=0.3742E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.7019

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    178.20  YB1   =    125.00  YB2   =    231.40
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.95
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    134.80  THETA =      0.00  SIGMA =      9.80  BETA  =     55.00
 U0    =      0.584 Q0    =      0.022       =0.2200E-01
 RHO0  =  999.7019  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1467E-03  m0    =0.8559E-04  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.2200E-01  M0    =0.1284E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      1.51  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      7.78  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.584 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      7.78
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.20  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       178.20 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.510   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.20m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.48     0.26    0.38   161.4 0.620E+00   0.30    74.97 .26393E+02
```

2.96	0.51	0.51	227.8	0.439E+00	0.60	74.95	.53783E+02
4.43	0.77	0.65	278.8	0.359E+00	0.90	74.92	.81358E+02
5.91	1.02	0.78	321.8	0.311E+00	1.20	74.90	.10903E+03
7.39	1.28	0.91	359.6	0.278E+00	1.50	74.88	.13676E+03
8.87	1.53	1.04	393.9	0.254E+00	1.80	74.86	.16454E+03
10.35	1.79	1.17	425.3	0.235E+00	2.10	74.84	.19234E+03
11.82	2.04	1.31	454.6	0.220E+00	2.40	74.82	.22018E+03
13.30	2.30	1.44	482.2	0.207E+00	2.70	74.80	.24803E+03
14.78	2.55	1.57	508.2	0.197E+00	3.00	74.78	.27591E+03
16.26	2.81	1.70	532.9	0.188E+00	3.30	74.77	.30380E+03
17.74	3.06	1.84	556.6	0.180E+00	3.60	74.75	.33170E+03
19.22	3.32	1.97	579.3	0.173E+00	3.90	74.74	.35961E+03
20.69	3.57	2.10	601.1	0.166E+00	4.20	74.72	.38754E+03
22.17	3.83	2.10	622.2	0.161E+00	4.20	74.71	.41547E+03
23.65	4.09	2.10	642.5	0.156E+00	4.20	74.70	.44341E+03
25.13	4.34	2.10	662.3	0.151E+00	4.20	74.69	.47136E+03
26.61	4.60	2.10	681.5	0.147E+00	4.20	74.68	.49931E+03
28.08	4.85	2.10	700.1	0.143E+00	4.20	74.67	.52728E+03
29.56	5.11	2.10	718.3	0.139E+00	4.20	74.66	.55524E+03
31.04	5.36	2.10	736.0	0.136E+00	4.20	74.65	.58322E+03
32.52	5.62	2.10	753.3	0.133E+00	4.20	74.64	.61120E+03
34.00	5.87	2.10	770.2	0.130E+00	4.20	74.63	.63918E+03
35.47	6.13	2.10	786.7	0.127E+00	4.20	74.62	.66717E+03
36.95	6.38	2.10	802.9	0.125E+00	4.20	74.61	.69516E+03
38.43	6.64	2.10	818.8	0.122E+00	4.20	74.60	.72315E+03
39.91	6.89	2.10	834.4	0.120E+00	4.20	74.60	.75115E+03
41.39	7.15	2.10	849.7	0.118E+00	4.20	74.59	.77915E+03
42.87	7.40	2.10	849.7	0.118E+00	4.20	74.58	.80698E+03
44.34	7.66	2.10	849.7	0.118E+00	4.20	74.58	.83481E+03
45.82	7.91	2.10	849.7	0.118E+00	4.20	74.57	.86264E+03
47.30	8.17	2.10	849.7	0.118E+00	4.20	74.56	.89046E+03
48.78	8.43	2.10	849.7	0.118E+00	4.20	74.56	.91829E+03
50.26	8.68	2.10	849.7	0.118E+00	4.20	74.55	.94612E+03
51.73	8.94	2.10	849.7	0.118E+00	4.20	74.55	.97394E+03
53.21	9.19	2.10	849.7	0.118E+00	4.20	74.55	.10018E+04
54.69	9.45	2.10	849.7	0.118E+00	4.20	74.54	.10296E+04
56.17	9.70	2.10	849.7	0.118E+00	4.20	74.54	.10574E+04
57.65	9.96	2.10	849.7	0.118E+00	4.20	74.54	.10853E+04
59.12	10.21	2.10	849.7	0.118E+00	4.20	74.53	.11131E+04
60.60	10.47	2.10	849.7	0.118E+00	4.20	74.53	.11409E+04
62.08	10.72	2.10	849.7	0.118E+00	4.20	74.53	.11687E+04
63.56	10.98	2.10	849.7	0.118E+00	4.20	74.53	.11966E+04
65.04	11.23	2.10	849.7	0.118E+00	4.20	74.53	.12244E+04
66.52	11.49	2.10	849.7	0.118E+00	4.20	74.53	.12522E+04
67.99	11.74	2.10	849.7	0.118E+00	4.20	74.53	.12800E+04
69.47	12.00	2.10	849.7	0.118E+00	4.20	74.52	.13079E+04
70.95	12.26	2.10	849.7	0.118E+00	4.20	74.52	.13357E+04
72.43	12.51	2.10	849.7	0.118E+00	4.20	74.52	.13635E+04
73.91	12.77	2.10	849.7	0.118E+00	4.20	74.52	.13913E+04

Cumulative travel time = 1391.3468 sec (0.39 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.63 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.327E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.408E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.91	12.77	4.20	849.7	0.118E+00	4.20	29.67	4.20	0.00	.13913E+04
212.43	12.77	4.20	861.0	0.116E+00	4.20	30.07	4.20	0.00	.32381E+04
350.95	12.77	4.20	872.2	0.115E+00	4.20	30.46	4.20	0.00	.50849E+04
489.47	12.77	4.20	883.3	0.113E+00	4.20	30.84	4.20	0.00	.69317E+04
627.99	12.77	4.20	894.2	0.112E+00	4.20	31.22	4.20	0.00	.87784E+04
766.52	12.77	4.20	905.0	0.110E+00	4.20	31.60	4.20	0.00	.10625E+05
905.04	12.77	4.20	915.7	0.109E+00	4.20	31.97	4.20	0.00	.12472E+05
1043.56	12.77	4.20	926.3	0.108E+00	4.20	32.34	4.20	0.00	.14319E+05
1182.08	12.77	4.20	936.7	0.107E+00	4.20	32.71	4.20	0.00	.16166E+05
1320.60	12.77	4.20	947.0	0.106E+00	4.20	33.07	4.20	0.00	.18012E+05
1459.12	12.77	4.20	957.2	0.104E+00	4.20	33.42	4.20	0.00	.19859E+05
1597.65	12.77	4.20	967.3	0.103E+00	4.20	33.78	4.20	0.00	.21706E+05
1736.17	12.77	4.20	977.3	0.102E+00	4.20	34.12	4.20	0.00	.23553E+05
1874.69	12.77	4.20	987.2	0.101E+00	4.20	34.47	4.20	0.00	.25399E+05
2013.21	12.77	4.20	997.0	0.100E+00	4.20	34.81	4.20	0.00	.27246E+05
2151.73	12.77	4.20	1006.7	0.993E-01	4.20	35.15	4.20	0.00	.29093E+05
2290.26	12.77	4.20	1016.3	0.984E-01	4.20	35.49	4.20	0.00	.30940E+05

2428.78	12.77	4.20	1025.8	0.975E-01	4.20	35.82	4.20	0.00	.32787E+05
2567.30	12.77	4.20	1035.2	0.966E-01	4.20	36.15	4.20	0.00	.34633E+05
2705.82	12.77	4.20	1044.6	0.957E-01	4.20	36.47	4.20	0.00	.36480E+05
2844.34	12.77	4.20	1053.8	0.949E-01	4.20	36.80	4.20	0.00	.38327E+05
2982.87	12.77	4.20	1063.0	0.941E-01	4.20	37.12	4.20	0.00	.40174E+05
3121.39	12.77	4.20	1072.1	0.933E-01	4.20	37.44	4.20	0.00	.42020E+05
3259.91	12.77	4.20	1081.1	0.925E-01	4.20	37.75	4.20	0.00	.43867E+05
3398.43	12.77	4.20	1090.1	0.917E-01	4.20	38.06	4.20	0.00	.45714E+05
3536.95	12.77	4.20	1099.0	0.910E-01	4.20	38.37	4.20	0.00	.47561E+05
3675.48	12.77	4.20	1107.8	0.903E-01	4.20	38.68	4.20	0.00	.49407E+05
3814.00	12.77	4.20	1116.5	0.896E-01	4.20	38.98	4.20	0.00	.51254E+05
3952.52	12.77	4.20	1125.2	0.889E-01	4.20	39.29	4.20	0.00	.53101E+05
4091.04	12.77	4.20	1133.8	0.882E-01	4.20	39.59	4.20	0.00	.54948E+05
4229.56	12.77	4.20	1142.3	0.875E-01	4.20	39.89	4.20	0.00	.56795E+05
4368.08	12.77	4.20	1150.8	0.869E-01	4.20	40.18	4.20	0.00	.58641E+05
4506.61	12.77	4.20	1159.2	0.863E-01	4.20	40.48	4.20	0.00	.60488E+05
4645.13	12.77	4.20	1167.5	0.857E-01	4.20	40.77	4.20	0.00	.62335E+05
4783.65	12.77	4.20	1175.8	0.850E-01	4.20	41.06	4.20	0.00	.64182E+05
4922.17	12.77	4.20	1184.1	0.845E-01	4.20	41.34	4.20	0.00	.66028E+05
5060.69	12.77	4.20	1192.2	0.839E-01	4.20	41.63	4.20	0.00	.67875E+05
5199.22	12.77	4.20	1200.4	0.833E-01	4.20	41.91	4.20	0.00	.69722E+05
5337.74	12.77	4.20	1208.4	0.828E-01	4.20	42.19	4.20	0.00	.71569E+05
5476.26	12.77	4.20	1216.4	0.822E-01	4.20	42.47	4.20	0.00	.73416E+05
5614.78	12.77	4.20	1224.4	0.817E-01	4.20	42.75	4.20	0.00	.75262E+05
5753.30	12.77	4.20	1232.3	0.811E-01	4.20	43.03	4.20	0.00	.77109E+05
5891.83	12.77	4.20	1240.2	0.806E-01	4.20	43.30	4.20	0.00	.78956E+05
6030.35	12.77	4.20	1248.0	0.801E-01	4.20	43.58	4.20	0.00	.80803E+05
6168.87	12.77	4.20	1255.7	0.796E-01	4.20	43.85	4.20	0.00	.82649E+05
6307.39	12.77	4.20	1263.5	0.791E-01	4.20	44.12	4.20	0.00	.84496E+05
6445.91	12.77	4.20	1271.1	0.787E-01	4.20	44.38	4.20	0.00	.86343E+05
6584.44	12.77	4.20	1278.7	0.782E-01	4.20	44.65	4.20	0.00	.88190E+05
6722.96	12.77	4.20	1286.3	0.777E-01	4.20	44.91	4.20	0.00	.90037E+05
6861.48	12.77	4.20	1293.8	0.773E-01	4.20	45.18	4.20	0.00	.91883E+05
7000.00	12.77	4.20	1301.3	0.768E-01	4.20	45.44	4.20	0.00	.93730E+05

```
 Cumulative travel time =       93730.0625 sec  (   26.04 hrs)

 Simulation limit based on maximum specified distance =   7000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
```

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario5
 FILE NAME:         E:\Projets\Nemaska\Scenarios\5\S5_Q40lps.prd
 Time stamp:        Tue Dec 16 09:31:03 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2940.00  QA    =    220.50  ICHREG= 1
 HA    =      4.20  HD    =      4.20
 UA    =      0.075 F     =      0.005 USTAR =0.1849E-02
 UW    =      3.300 UWSTAR=0.3742E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.7019

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    178.20  YB1   =    125.00  YB2   =    231.40
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.95
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    134.80  THETA =      0.00  SIGMA =      9.80  BETA  =     55.00
 U0    =      1.061 Q0    =      0.040       =0.4000E-01
 RHO0  =  999.7019  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.2667E-03  m0    =0.2829E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.05
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4000E-01  M0    =0.4244E-01  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      2.75  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.15  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.061 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     14.15
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.20  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       178.20 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     0.987   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.20m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.48     0.26    0.38    89.8 0.111E+01   0.30    74.91 .23067E+02
```

2.96	0.51	0.51	126.6	0.790E+00	0.60	74.83	.48705E+02
4.43	0.77	0.65	154.9	0.646E+00	0.90	74.75	.74915E+02
5.91	1.02	0.78	178.7	0.560E+00	1.20	74.67	.10143E+03
7.39	1.28	0.91	199.7	0.501E+00	1.50	74.61	.12814E+03
8.87	1.53	1.04	218.6	0.457E+00	1.80	74.54	.15498E+03
10.35	1.79	1.17	236.1	0.424E+00	2.10	74.48	.18194E+03
11.82	2.04	1.31	252.3	0.396E+00	2.40	74.42	.20897E+03
13.30	2.30	1.44	267.5	0.374E+00	2.70	74.36	.23608E+03
14.78	2.55	1.57	282.0	0.355E+00	3.00	74.31	.26325E+03
16.26	2.81	1.70	295.7	0.338E+00	3.30	74.26	.29046E+03
17.74	3.06	1.84	308.8	0.324E+00	3.60	74.21	.31772E+03
19.22	3.32	1.97	321.3	0.311E+00	3.90	74.17	.34501E+03
20.69	3.57	2.10	333.4	0.300E+00	4.20	74.12	.37234E+03
22.17	3.83	2.10	345.1	0.290E+00	4.20	74.08	.39970E+03
23.65	4.09	2.10	356.4	0.281E+00	4.20	74.04	.42708E+03
25.13	4.34	2.10	367.3	0.272E+00	4.20	74.00	.45449E+03
26.61	4.60	2.10	377.9	0.265E+00	4.20	73.97	.48193E+03
28.08	4.85	2.10	388.3	0.258E+00	4.20	73.93	.50938E+03
29.56	5.11	2.10	398.3	0.251E+00	4.20	73.90	.53685E+03
31.04	5.36	2.10	408.1	0.245E+00	4.20	73.87	.56434E+03
32.52	5.62	2.10	417.7	0.239E+00	4.20	73.84	.59185E+03
34.00	5.87	2.10	427.1	0.234E+00	4.20	73.81	.61937E+03
35.47	6.13	2.10	436.3	0.229E+00	4.20	73.79	.64690E+03
36.95	6.38	2.10	445.2	0.225E+00	4.20	73.76	.67445E+03
38.43	6.64	2.10	454.0	0.220E+00	4.20	73.73	.70201E+03
39.91	6.89	2.10	462.7	0.216E+00	4.20	73.71	.72958E+03
41.39	7.15	2.10	471.1	0.212E+00	4.20	73.69	.75717E+03
42.87	7.40	2.10	471.1	0.212E+00	4.20	73.67	.78421E+03
44.34	7.66	2.10	471.1	0.212E+00	4.20	73.65	.81125E+03
45.82	7.91	2.10	471.1	0.212E+00	4.20	73.63	.83829E+03
47.30	8.17	2.10	471.1	0.212E+00	4.20	73.61	.86533E+03
48.78	8.43	2.10	471.1	0.212E+00	4.20	73.60	.89238E+03
50.26	8.68	2.10	471.1	0.212E+00	4.20	73.58	.91942E+03
51.73	8.94	2.10	471.1	0.212E+00	4.20	73.57	.94646E+03
53.21	9.19	2.10	471.1	0.212E+00	4.20	73.56	.97350E+03
54.69	9.45	2.10	471.1	0.212E+00	4.20	73.54	.10005E+04
56.17	9.70	2.10	471.1	0.212E+00	4.20	73.53	.10276E+04
57.65	9.96	2.10	471.1	0.212E+00	4.20	73.53	.10546E+04
59.12	10.21	2.10	471.1	0.212E+00	4.20	73.52	.10817E+04
60.60	10.47	2.10	471.1	0.212E+00	4.20	73.51	.11087E+04
62.08	10.72	2.10	471.1	0.212E+00	4.20	73.50	.11358E+04
63.56	10.98	2.10	471.1	0.212E+00	4.20	73.50	.11628E+04
65.04	11.23	2.10	471.1	0.212E+00	4.20	73.50	.11898E+04
66.52	11.49	2.10	471.1	0.212E+00	4.20	73.49	.12169E+04
67.99	11.74	2.10	471.1	0.212E+00	4.20	73.49	.12439E+04
69.47	12.00	2.10	471.1	0.212E+00	4.20	73.49	.12710E+04
70.95	12.26	2.10	471.1	0.212E+00	4.20	73.48	.12980E+04
72.43	12.51	2.10	471.1	0.212E+00	4.20	73.48	.13250E+04
73.91	12.77	2.10	471.1	0.212E+00	4.20	73.48	.13521E+04

Cumulative travel time = 1352.0846 sec (0.38 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

```
 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
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** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.64 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
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BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.327E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.408E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.91	12.77	4.20	471.1	0.212E+00	4.20	29.91	4.20	0.00	.13521E+04
212.43	12.77	4.20	477.3	0.209E+00	4.20	30.30	4.20	0.00	.31987E+04
350.95	12.77	4.20	483.4	0.207E+00	4.20	30.69	4.20	0.00	.50453E+04
489.47	12.77	4.20	489.5	0.204E+00	4.20	31.07	4.20	0.00	.68920E+04
627.99	12.77	4.20	495.5	0.202E+00	4.20	31.45	4.20	0.00	.87386E+04
766.52	12.77	4.20	501.4	0.199E+00	4.20	31.83	4.20	0.00	.10585E+05
905.04	12.77	4.20	507.2	0.197E+00	4.20	32.20	4.20	0.00	.12432E+05
1043.56	12.77	4.20	512.9	0.195E+00	4.20	32.56	4.20	0.00	.14278E+05
1182.08	12.77	4.20	518.6	0.193E+00	4.20	32.92	4.20	0.00	.16125E+05
1320.60	12.77	4.20	524.3	0.191E+00	4.20	33.28	4.20	0.00	.17972E+05
1459.12	12.77	4.20	529.9	0.189E+00	4.20	33.64	4.20	0.00	.19818E+05
1597.65	12.77	4.20	535.4	0.187E+00	4.20	33.99	4.20	0.00	.21665E+05
1736.17	12.77	4.20	540.8	0.185E+00	4.20	34.33	4.20	0.00	.23512E+05
1874.69	12.77	4.20	546.2	0.183E+00	4.20	34.68	4.20	0.00	.25358E+05
2013.21	12.77	4.20	551.6	0.181E+00	4.20	35.02	4.20	0.00	.27205E+05
2151.73	12.77	4.20	556.9	0.180E+00	4.20	35.35	4.20	0.00	.29051E+05
2290.26	12.77	4.20	562.1	0.178E+00	4.20	35.69	4.20	0.00	.30898E+05

2428.78	12.77	4.20	567.4	0.176E+00	4.20	36.02	4.20	0.00	.32745E+05
2567.30	12.77	4.20	572.5	0.175E+00	4.20	36.34	4.20	0.00	.34591E+05
2705.82	12.77	4.20	577.6	0.173E+00	4.20	36.67	4.20	0.00	.36438E+05
2844.34	12.77	4.20	582.7	0.172E+00	4.20	36.99	4.20	0.00	.38285E+05
2982.87	12.77	4.20	587.7	0.170E+00	4.20	37.31	4.20	0.00	.40131E+05
3121.39	12.77	4.20	592.7	0.169E+00	4.20	37.62	4.20	0.00	.41978E+05
3259.91	12.77	4.20	597.6	0.167E+00	4.20	37.94	4.20	0.00	.43824E+05
3398.43	12.77	4.20	602.5	0.166E+00	4.20	38.25	4.20	0.00	.45671E+05
3536.95	12.77	4.20	607.4	0.165E+00	4.20	38.56	4.20	0.00	.47518E+05
3675.48	12.77	4.20	612.2	0.163E+00	4.20	38.86	4.20	0.00	.49364E+05
3814.00	12.77	4.20	617.0	0.162E+00	4.20	39.17	4.20	0.00	.51211E+05
3952.52	12.77	4.20	621.7	0.161E+00	4.20	39.47	4.20	0.00	.53058E+05
4091.04	12.77	4.20	626.4	0.160E+00	4.20	39.77	4.20	0.00	.54904E+05
4229.56	12.77	4.20	631.1	0.158E+00	4.20	40.06	4.20	0.00	.56751E+05
4368.08	12.77	4.20	635.8	0.157E+00	4.20	40.36	4.20	0.00	.58597E+05
4506.61	12.77	4.20	640.4	0.156E+00	4.20	40.65	4.20	0.00	.60444E+05
4645.13	12.77	4.20	644.9	0.155E+00	4.20	40.94	4.20	0.00	.62291E+05
4783.65	12.77	4.20	649.5	0.154E+00	4.20	41.23	4.20	0.00	.64137E+05
4922.17	12.77	4.20	654.0	0.153E+00	4.20	41.52	4.20	0.00	.65984E+05
5060.69	12.77	4.20	658.5	0.152E+00	4.20	41.80	4.20	0.00	.67831E+05
5199.22	12.77	4.20	662.9	0.151E+00	4.20	42.08	4.20	0.00	.69677E+05
5337.74	12.77	4.20	667.3	0.150E+00	4.20	42.36	4.20	0.00	.71524E+05
5476.26	12.77	4.20	671.7	0.149E+00	4.20	42.64	4.20	0.00	.73370E+05
5614.78	12.77	4.20	676.1	0.148E+00	4.20	42.92	4.20	0.00	.75217E+05
5753.30	12.77	4.20	680.4	0.147E+00	4.20	43.19	4.20	0.00	.77064E+05
5891.83	12.77	4.20	684.7	0.146E+00	4.20	43.47	4.20	0.00	.78910E+05
6030.35	12.77	4.20	689.0	0.145E+00	4.20	43.74	4.20	0.00	.80757E+05
6168.87	12.77	4.20	693.3	0.144E+00	4.20	44.01	4.20	0.00	.82604E+05
6307.39	12.77	4.20	697.5	0.143E+00	4.20	44.28	4.20	0.00	.84450E+05
6445.91	12.77	4.20	701.7	0.143E+00	4.20	44.54	4.20	0.00	.86297E+05
6584.44	12.77	4.20	705.9	0.142E+00	4.20	44.81	4.20	0.00	.88143E+05
6722.96	12.77	4.20	710.0	0.141E+00	4.20	45.07	4.20	0.00	.89990E+05
6861.48	12.77	4.20	714.1	0.140E+00	4.20	45.33	4.20	0.00	.91837E+05
7000.00	12.77	4.20	718.2	0.139E+00	4.20	45.59	4.20	0.00	.93683E+05

Cumulative travel time = 93683.2578 sec (26.02 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2

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CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
2
                        CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX2: Multiport Diffuser Discharges
                              CORMIX Version 8.0GT
                      HYDRO2 Version 8.0.0.0 April 2012
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Lac des Montagnes
 Design case:       Scenario5
 FILE NAME:         E:\Projets\Nemaska\Scenarios\5\S5_Q62lps.prd
 Time stamp:        Tue Dec 16 09:31:38 2014

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    700.00  AS    =   2940.00  QA    =    220.50  ICHREG= 1
 HA    =      4.20  HD    =      4.20
 UA    =      0.075 F     =      0.005 USTAR =0.1849E-02
 UW    =      3.300 UWSTAR=0.3742E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.7019

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  RIGHT     DISTB =    178.20  YB1   =    125.00  YB2   =    231.40
 LD    =    150.00  NOPEN =   30       SPAC  =      5.17
 D0    =      0.040 A0    =      0.001 H0    =      0.25  SUB0  =      3.95
 D0INP =      0.040 CR0   =      1.000
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =    134.80  THETA =      0.00  SIGMA =      9.80  BETA  =     55.00
 U0    =      1.645 Q0    =      0.062       =0.6200E-01
 RHO0  =  999.7019  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.4133E-03  m0    =0.6798E-03  j0    =0.0000E+00  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.000 lM    =  99999.00  lm    =      0.12
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.6200E-01  M0    =0.1020E+00  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =      4.26  Lb    =      0.00
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =     21.93  PL    =    0.00
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      1.645 D0    =      0.040 A0    =      0.001 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =     21.93
```

```
 (slot)             (riser group)

FLOW CLASSIFICATION
 22222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     4.20  2
 22222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   7000.00  XMAX  =   7000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
       178.20 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
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-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH       Uc        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00     1.571   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
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-----------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    4.20m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

       X        Y       Z        S       C       BV       BH        TT
      0.00     0.00    0.25     1.0 0.100E+03   0.00    75.00 .00000E+00
      1.48     0.26    0.38    59.2 0.169E+01   0.30    74.80 .18515E+02
```

2.96	0.51	0.51	83.3	0.120E+01	0.60	74.61	.41112E+02
4.43	0.77	0.65	101.7	0.983E+00	0.90	74.44	.64858E+02
5.91	1.02	0.78	117.3	0.852E+00	1.20	74.27	.89239E+02
7.39	1.28	0.91	131.1	0.763E+00	1.50	74.11	.11404E+03
8.87	1.53	1.04	143.5	0.697E+00	1.80	73.97	.13915E+03
10.35	1.79	1.17	154.9	0.646E+00	2.10	73.83	.16448E+03
11.82	2.04	1.31	165.5	0.604E+00	2.40	73.70	.19001E+03
13.30	2.30	1.44	175.5	0.570E+00	2.70	73.57	.21569E+03
14.78	2.55	1.57	184.9	0.541E+00	3.00	73.45	.24150E+03
16.26	2.81	1.70	193.9	0.516E+00	3.30	73.34	.26743E+03
17.74	3.06	1.84	202.5	0.494E+00	3.60	73.23	.29345E+03
19.22	3.32	1.97	210.7	0.475E+00	3.90	73.13	.31955E+03
20.69	3.57	2.10	218.6	0.457E+00	4.20	73.03	.34574E+03
22.17	3.83	2.10	226.3	0.442E+00	4.20	72.94	.37199E+03
23.65	4.09	2.10	233.7	0.428E+00	4.20	72.85	.39830E+03
25.13	4.34	2.10	240.8	0.415E+00	4.20	72.77	.42467E+03
26.61	4.60	2.10	247.8	0.404E+00	4.20	72.69	.45109E+03
28.08	4.85	2.10	254.5	0.393E+00	4.20	72.61	.47755E+03
29.56	5.11	2.10	261.1	0.383E+00	4.20	72.54	.50407E+03
31.04	5.36	2.10	267.5	0.374E+00	4.20	72.47	.53062E+03
32.52	5.62	2.10	273.8	0.365E+00	4.20	72.40	.55721E+03
34.00	5.87	2.10	279.9	0.357E+00	4.20	72.34	.58383E+03
35.47	6.13	2.10	285.9	0.350E+00	4.20	72.28	.61049E+03
36.95	6.38	2.10	291.8	0.343E+00	4.20	72.22	.63718E+03
38.43	6.64	2.10	297.6	0.336E+00	4.20	72.16	.66389E+03
39.91	6.89	2.10	303.2	0.330E+00	4.20	72.11	.69064E+03
41.39	7.15	2.10	308.8	0.324E+00	4.20	72.06	.71741E+03
42.87	7.40	2.10	308.8	0.324E+00	4.20	72.01	.74303E+03
44.34	7.66	2.10	308.8	0.324E+00	4.20	71.97	.76865E+03
45.82	7.91	2.10	308.8	0.324E+00	4.20	71.93	.79427E+03
47.30	8.17	2.10	308.8	0.324E+00	4.20	71.89	.81990E+03
48.78	8.43	2.10	308.8	0.324E+00	4.20	71.85	.84552E+03
50.26	8.68	2.10	308.8	0.324E+00	4.20	71.82	.87114E+03
51.73	8.94	2.10	308.8	0.324E+00	4.20	71.79	.89676E+03
53.21	9.19	2.10	308.8	0.324E+00	4.20	71.76	.92238E+03
54.69	9.45	2.10	308.8	0.324E+00	4.20	71.74	.94800E+03
56.17	9.70	2.10	308.8	0.324E+00	4.20	71.72	.97363E+03
57.65	9.96	2.10	308.8	0.324E+00	4.20	71.70	.99925E+03
59.12	10.21	2.10	308.8	0.324E+00	4.20	71.68	.10249E+04
60.60	10.47	2.10	308.8	0.324E+00	4.20	71.66	.10505E+04
62.08	10.72	2.10	308.8	0.324E+00	4.20	71.65	.10761E+04
63.56	10.98	2.10	308.8	0.324E+00	4.20	71.64	.11017E+04
65.04	11.23	2.10	308.8	0.324E+00	4.20	71.63	.11274E+04
66.52	11.49	2.10	308.8	0.324E+00	4.20	71.62	.11530E+04
67.99	11.74	2.10	308.8	0.324E+00	4.20	71.61	.11786E+04
69.47	12.00	2.10	308.8	0.324E+00	4.20	71.61	.12042E+04
70.95	12.26	2.10	308.8	0.324E+00	4.20	71.60	.12298E+04
72.43	12.51	2.10	308.8	0.324E+00	4.20	71.60	.12555E+04
73.91	12.77	2.10	308.8	0.324E+00	4.20	71.60	.12811E+04

Cumulative travel time = 1281.0876 sec (0.36 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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 Phase 1: Vertically mixed, Phase 2: Re-stratified

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
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** End of NEAR-FIELD REGION (NFR) **

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  0.65 to conserve the mass flux in the far-field!
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.327E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.408E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
73.91	12.77	4.20	308.8	0.324E+00	4.20	30.38	4.20	0.00	.12811E+04
212.43	12.77	4.20	312.7	0.320E+00	4.20	30.77	4.20	0.00	.31275E+04
350.95	12.77	4.20	316.6	0.316E+00	4.20	31.15	4.20	0.00	.49740E+04
489.47	12.77	4.20	320.4	0.312E+00	4.20	31.53	4.20	0.00	.68204E+04
627.99	12.77	4.20	324.2	0.308E+00	4.20	31.90	4.20	0.00	.86668E+04
766.52	12.77	4.20	328.0	0.305E+00	4.20	32.27	4.20	0.00	.10513E+05
905.04	12.77	4.20	331.7	0.301E+00	4.20	32.63	4.20	0.00	.12360E+05
1043.56	12.77	4.20	335.4	0.298E+00	4.20	32.99	4.20	0.00	.14206E+05
1182.08	12.77	4.20	339.0	0.295E+00	4.20	33.35	4.20	0.00	.16053E+05
1320.60	12.77	4.20	342.6	0.292E+00	4.20	33.71	4.20	0.00	.17899E+05
1459.12	12.77	4.20	346.1	0.289E+00	4.20	34.05	4.20	0.00	.19745E+05
1597.65	12.77	4.20	349.7	0.286E+00	4.20	34.40	4.20	0.00	.21592E+05
1736.17	12.77	4.20	353.1	0.283E+00	4.20	34.74	4.20	0.00	.23438E+05
1874.69	12.77	4.20	356.6	0.280E+00	4.20	35.08	4.20	0.00	.25285E+05
2013.21	12.77	4.20	360.0	0.278E+00	4.20	35.42	4.20	0.00	.27131E+05
2151.73	12.77	4.20	363.4	0.275E+00	4.20	35.75	4.20	0.00	.28978E+05
2290.26	12.77	4.20	366.7	0.273E+00	4.20	36.08	4.20	0.00	.30824E+05

2428.78	12.77	4.20	370.1	0.270E+00	4.20	36.41	4.20	0.00	.32671E+05
2567.30	12.77	4.20	373.3	0.268E+00	4.20	36.73	4.20	0.00	.34517E+05
2705.82	12.77	4.20	376.6	0.266E+00	4.20	37.05	4.20	0.00	.36363E+05
2844.34	12.77	4.20	379.8	0.263E+00	4.20	37.37	4.20	0.00	.38210E+05
2982.87	12.77	4.20	383.0	0.261E+00	4.20	37.69	4.20	0.00	.40056E+05
3121.39	12.77	4.20	386.2	0.259E+00	4.20	38.00	4.20	0.00	.41903E+05
3259.91	12.77	4.20	389.4	0.257E+00	4.20	38.31	4.20	0.00	.43749E+05
3398.43	12.77	4.20	392.5	0.255E+00	4.20	38.62	4.20	0.00	.45596E+05
3536.95	12.77	4.20	395.6	0.253E+00	4.20	38.92	4.20	0.00	.47442E+05
3675.48	12.77	4.20	398.7	0.251E+00	4.20	39.23	4.20	0.00	.49289E+05
3814.00	12.77	4.20	401.8	0.249E+00	4.20	39.53	4.20	0.00	.51135E+05
3952.52	12.77	4.20	404.8	0.247E+00	4.20	39.83	4.20	0.00	.52981E+05
4091.04	12.77	4.20	407.8	0.245E+00	4.20	40.12	4.20	0.00	.54828E+05
4229.56	12.77	4.20	410.8	0.243E+00	4.20	40.42	4.20	0.00	.56674E+05
4368.08	12.77	4.20	413.8	0.242E+00	4.20	40.71	4.20	0.00	.58521E+05
4506.61	12.77	4.20	416.7	0.240E+00	4.20	41.00	4.20	0.00	.60367E+05
4645.13	12.77	4.20	419.6	0.238E+00	4.20	41.29	4.20	0.00	.62214E+05
4783.65	12.77	4.20	422.5	0.237E+00	4.20	41.57	4.20	0.00	.64060E+05
4922.17	12.77	4.20	425.4	0.235E+00	4.20	41.86	4.20	0.00	.65906E+05
5060.69	12.77	4.20	428.3	0.233E+00	4.20	42.14	4.20	0.00	.67753E+05
5199.22	12.77	4.20	431.1	0.232E+00	4.20	42.42	4.20	0.00	.69599E+05
5337.74	12.77	4.20	434.0	0.230E+00	4.20	42.70	4.20	0.00	.71446E+05
5476.26	12.77	4.20	436.8	0.229E+00	4.20	42.97	4.20	0.00	.73292E+05
5614.78	12.77	4.20	439.6	0.227E+00	4.20	43.25	4.20	0.00	.75139E+05
5753.30	12.77	4.20	442.3	0.226E+00	4.20	43.52	4.20	0.00	.76985E+05
5891.83	12.77	4.20	445.1	0.225E+00	4.20	43.79	4.20	0.00	.78832E+05
6030.35	12.77	4.20	447.8	0.223E+00	4.20	44.06	4.20	0.00	.80678E+05
6168.87	12.77	4.20	450.6	0.222E+00	4.20	44.33	4.20	0.00	.82524E+05
6307.39	12.77	4.20	453.3	0.221E+00	4.20	44.59	4.20	0.00	.84371E+05
6445.91	12.77	4.20	456.0	0.219E+00	4.20	44.86	4.20	0.00	.86217E+05
6584.44	12.77	4.20	458.6	0.218E+00	4.20	45.12	4.20	0.00	.88064E+05
6722.96	12.77	4.20	461.3	0.217E+00	4.20	45.38	4.20	0.00	.89910E+05
6861.48	12.77	4.20	463.9	0.216E+00	4.20	45.64	4.20	0.00	.91757E+05
7000.00	12.77	4.20	466.6	0.214E+00	4.20	45.90	4.20	0.00	.93603E+05

Cumulative travel time = 93603.0547 sec (26.00 hrs)

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX2: Multiport Diffuser Discharges End of Prediction File

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